

PRINTOUT PRINTOUT PRINTOUT

PET
Survey Results

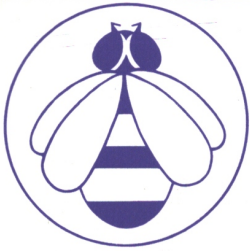
All about the

PET Computer



July/August 1980

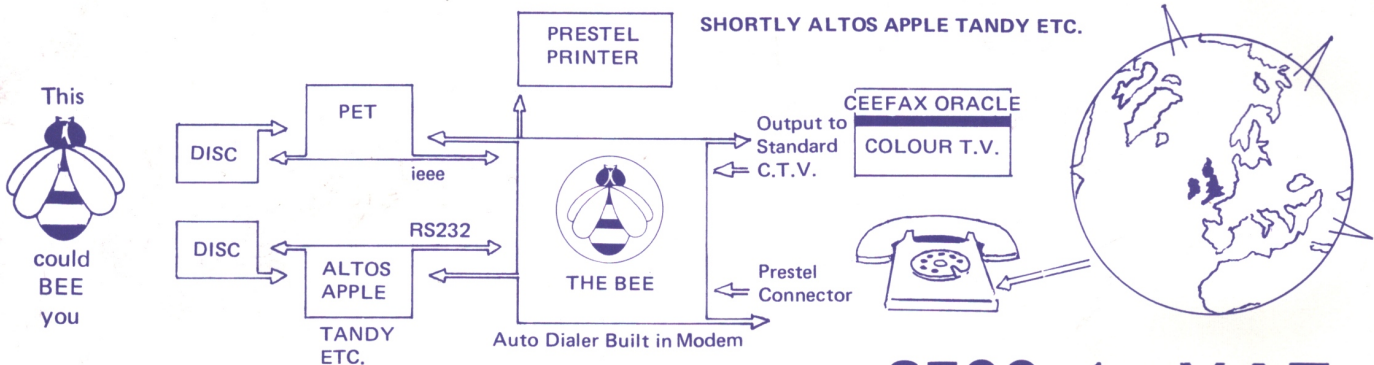
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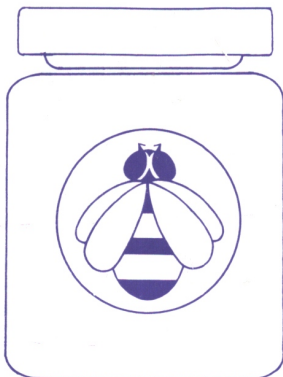
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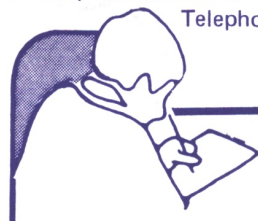
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The Editor writes...

One's first editorial is never very easy to write. And when one has taken the editor's chair of a magazine like PRINTOUT, it's a doubly difficult task.

Why? Because PRINTOUT is already established, catering for what seems a clearly-defined group of people, with specific desires and tastes. The last thing a new editor wants to do is get them all riled up!

But it's odd how our actual and potential audience is, in fact, subtly but inexorably changing. Or is 'changing' the right word, I wonder? When I first thought about change, I was musing over the definite shift in user-emphasis which PET has been experiencing.

There's no doubt at all that PET began as a hobbyists' computer. How else would that quaintly (and to some nostalgically) small keyboard ever have been designed and released?

The answer, of course, is so that everything, including data storage via cassette unit, would be in one case.

And, of course, hobbyists bought it by the thousand.

Now, PET is moving - many would say has already moved - towards being a fully-fledged business computer. For the smaller business, certainly, but a genuinely viable business machine for all that.

The bigger keyboard; the range of printers that can be attached; the various disk units that are available (notwithstanding the current random access performance of CBM's own product!); and the ever-growing army of plug-compatible peripherals - all

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these are combining to move PET up-market.

Sure, there are many small keyboard PETs still around, and I suspect the time will come when they will command a high price as vintage models. And their army of enthusiastic users will remain, perhaps even grow too.

Certainly the debate will continue as to whether Chuck Peddle's original concept of 'everything-in-one-box' was right or wrong; should have been retained at all cost, or was quite properly discarded when the mark had been made; was traitorously thrown overboard, or simply evolutionary, and the threshold to better things.

Now, of course, we have what we in PRINTOUT have dubbed the Super-PET, with its 80-column screen, complete with 'windows' and its own galaxy of peripherals bearing the CBM marque.

There is evidence, however, that CBM are not going to forget their original faithful army of hobbyist users (if not actually designing specifically for them) - the very people who, some would say, first lifted CBM from a company teetering on the edge of financial disaster to the money-spinner it is today.

Certainly they're the original group who pioneered the vast amount of software available for PET. Ironically, that very process helped bring about the change they might regret.

For it's certainly true that the more software there is, the more non-computer orientated people get interested in the possibility of solving their own, usually business, problems with-

out the hassle of learning what is, to them, the esoteric mysteries of programming.

Should our emphasis be the ever-increasing business-user approach of PET itself? Let's make no mistake about it: that must mean fewer or no 'how to' articles, the space instead going to 'can it or can't it do the job I want' features.

For the businessman isn't really interested in what a cunningly placed POKE might achieve. He simply wants to know if his payroll will run or not.

Or should we remain faithful to our own origins, having fun with and exploring the highways and byways of programming and hardware, but risk-being dismissed as a fun magazine, of no real significance in the up-market PET world of today?

Should we perhaps try to satisfy both worlds, with the ever-present danger of challenging, stimulating and informing neither?

Heretically, should we even consider the possibility of broadening our base? The long-awaited computer revolution seems to be here - Atari and other 6502-based units are rather larger than the well-known fist-sized cloud on the horizon.

These are interesting times, folks, and we'd welcome your views in this, a key forum for us and, I believe, you also.

One thing's for sure, and you should make no mistake about it - PRINTOUT will be around, growing lustily, for a long time to come, to reflect what you collectively think.

TERRY HOPE

KINGSTON

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- PET IEEE connector for daisy chaining.
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SANDERS' SUPPORT

Gavin Sanders' reminder that many of your readers are rather thick and ignorant is well illustrated by Ron Geere's answer in Issue 4. "How about a program that rewrites itself?", says he. Well, how nice that would be. But, he says, "you will have to find the address of the token". Would he credit it that there are habitual users of old PETs who just don't know how to do that. Couldn't he tell us how? Myself, I looked at "Tokens" by Nigel West in February's issue. I took these numbers to be the addresses that Ron Geere refers to, and tried poking them to 143. Of course, it didn't work. This highly useful and interesting information comes to us, but always in hints — glimpses seen through a fog of other people's knowledge. Please, Ron, give us an actual worked example of how to get rid of a PRINT instruction second time round a loop — for old PETs, as well as new ones. And tell us if Nigel West's list is correct for old PETs.

R N Higinbotham
Cleaver Square
London SE11 4EA

First, to be fair on Ron Geere, he wrote to Gavin Sanders quite quickly. His letter, with all the others, had unavoidably to be held over from the last issue. You'll find it below. However, his reply tends to to underline the very point you're making, as you'll see. It fairly adeptly misses the point, but we suspect that's not because Ron doesn't know the answer. He simply hasn't got round to it! Second, Gregory Yob's long piece on tokens in the last issue of PRINTOUT should have done much to help you. Third, in this issue you'll find an equally informative piece on old-ROM/new-ROM tokens and their addresses, from the Director of Audit in the Post Office, no less. Fourth, see the last letter in this feature. Fifth, thanks for being so outspoken. Keep writing!

GEERE GETS BACK (partly)!

I'm still out here, Gavin, so permit me to elaborate on my "print in a loop" item. Before anyone suggests moving the PRINT outside the loop, on the assumption that I meant a FOR/NEXT loop, let me say that I meant looping in the broadest sense of RUNPRINT for the first time-END: RUN again — don't PRINT this time-END. And PRINT needn't be a screen message, of course; it could be something else, like part of an instruction to initialise a disk drive. To find the token, you can wade through masses of hex code, using the machine-language monitor, looking for the elusive address of the required token. When you

find it in hex and convert it to decimal, don't dare modify any preceding program line, for its address may change as a result! The other choice is to get PET to find the token, but to do it requires a little more know-how. It involves writing a short routine in machine code to find the line concerned, and then identify and change the token. This has the advantage that changing a line or so won't affect PET's ability to find the required token.

Ron Geere
York Road
Farnborough, Hants

Ahem! Ron... you haven't answered the question!

IN REVERSE

Here's a Basic loader program that your readers might like to try. It provides an instantaneous screen reverse (that's the same as a "clear screen" command, but it's in reverse field). It could probably be shortened if anyone knows how to nest loops in machine-code. Unfortunately I don't! The program runs on the command SYS 832, and resides in the second cassette buffer.

```
100 FORI=832TO866:READN:POKEI,N:
NEXTI
110 DATA162,250,169,160,157,237,130
120 DATA202,208,250,130,250,157,243
130 DATA129,202,208,250,162,250,157
140 DATA249,128,202,208,250,162,250
150 DATA157,255,127,202,208,250,96
```

J R Bullard Dip.A/D
Buckland Brewer, Bideford
North Devon

Thanks a lot, Mr Bullard. We've tried it and it's great! For what exactly, we're not sure, but it certainly works a treat. What did you develop it for, and how do you use it? And you other thousands of PRINTOUT readers: how would you use this? And what other tricks are up your particular sleeves?

A GIFT FOR GAVIN

I'd like to thank Gavin Sanders for a very interesting series of articles since PRINTOUT first appeared. I find the magazine fascinating, and can honestly say that I'm at last beginning to solve some of the mysteries surrounding my 16K PET. Honestly, you'd think when charging £600 odd for something, they'd produce a decent manual. About the only thing I could understand at first was the graphics section. Why can't Commodore do an instruction book like the one for the Toolkit. Now that's what a manual should be! There's one thing I'd like to see in PRINTOUT, and that's a program (or at least some hints) on cataloguing an extensive record collection. So far, I've only gone round in circles! I liked Gavin's

tip about checking tapes to see if there was anything on them or not. All those Chinese chevrons going across the screen are great! My next ambition is to get a printer, so that when some firm sends me a printout, saying they've become computerised, and would I quote this 95-digit number in all correspondence, I'd send them a printout, saying I've become computerised too. That should be interesting! Anyway, thanks for a great magazine — I reckon I've got my money's worth so far!

Colin Jeffery
The Crossways
Gosport, Hants

And thank you too, Colin! On the program to catalogue a record collection, we'll have a think. With luck, a reader that's done it already will appear from the mist, and we'll all share his/her?) genius. We're not sure we should mention 'chinese chevron' reference - we have a suspicion you're working a naughty joke in. Our man Gregory Yob wrote the Toolkit instruction book, so what do you expect? He's one of the most lucid people we know! We've already got computerised letter going. We use it every time we return a book we don't want to a certain well-known mail order firm. It works a treat! Gavin is too pink to add anything else, though we think he's lifted something from your letter for his page.

A REPLY FOR GREG (A)

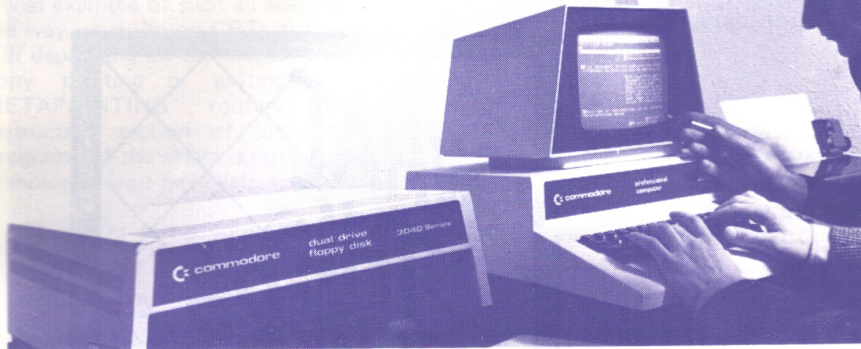
Gregory Yob's readers may like this two-line program, which will convert any number of hex digits to decimal. The ACSII reading approach produces speeds about twice the data reading method. And unlike the latter, speed doesn't depend on the value of the digits entered, only their number. I hope everyone will be able to read Line 10. You have to leave all the spaces out to get it in!

```
10 INPUT$:FORI=LEN(H$)TO1STEP-1:
A$=MID$(H$,I,1):D(I)=ASC(A$)-48+
(ASC(A$)>57)*7
20 X=X+1:N=N+D(I)*16*(X-1):NEXT:
PRINT"cursor up"TAB(20)"="N:CLR:
GOTO10
```

E P C Singleton
New Amberden Hall
Debden Green
Saffron Walden

Thanks from us and from Gregory, Mr Singleton. Gregory has that strange knack of not only being totally understandable, but also of inspiring others to write and be understandable too. We like your two-liner. Have you got more?

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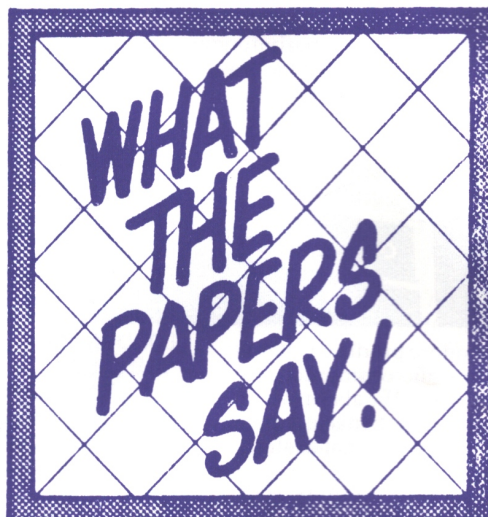
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READ/WRITE (Continued)

WOW, METAPRINTING YET!

Human cultures depend on tradition to maintain a necessary stability in order to more effectively withstand the forces of change. Thus we carry old concepts and procedures over from the old media to the new, even when they're no longer necessary, or even desirable. A perhaps trivial example of such an anachronism is the way we write on CRTs as if we were still depending on the mechanics of hard-copy printing or writing. Try this METAPRINTING routine in the instruction section of some of your programs. If the effect is not eye-pleasing it should at least be novel.

```

100 REM P$ IS THE STRING TO BE
    PRINTED IN YOUR PROGRAM. THEN
110 REM CALL THE SUBROUTINE.
200 READ A
210 IFA$="END" THEN POKE 513,10:WAIT
    513,10:PRINTCHR$(147):RUN
220 P$=A$
230 GOSUB 60000
240 GOTO 200
500 DATA "METAPRINTING DEMO", "-----"
    "-----":REM 40
510 DATA "YOU ONLY GET WONDERFUL
    ROUTINES LIKE"
520 DATA "THIS IN PRINTOUT", "*****"
530 DATA "IF YOU DO NOT ALREADY
    SUBSCRIBE", "THEN HERE IS ONE
    MORE GREAT"
540 DATA "REASON TO DO SO", "DON'T
    DELAY - DO IT TODAY!"
550 DATA "END"
60000 LX=LEN(P$)
60010 IF LX/2<INT(LX/2) THEN P$=P$+
    CHR$(32):LX=LX+1
60020 FOR IX=1 TO LX/2
60030 PRINTTAB(20-IX):MID$(P$,LX/2+
    1-IX,1)CHR$(145)
60040 PRINTTAB(19+IX):MID$(P$,LX/2+
    IX,1)CHR$(145)
60050 NEXT IX
60060 PRINT:PRINT
60070 RETURN

```

John Matarella
New York
U.S.A.

John's letter made us think. His routine made us blink. The effect is too good to give away in advance; that'd be like telling you whodunnit before you started in on a detective story. Try it. You'll like it. Or if you feel like a challenge, have a go at working out what's going to happen before you try it!

THE ORACLE SPEAKS

May we inform you that we're now running three pages on Oracle? You'll find them on 451. One of the pages is called "PET Talk", and is designed to keep PET users abreast of PET news. You're welcome to submit anything that might be of interest.

Mary Thomas
Audiogenic Records and Tapes
Crown Street, Reading
Berkshire

Thanks, Mary. We've had a look and we'd advise readers to do the same, if they've got the Ceefax-Oracle facility on their TV sets.

A REPLY FOR GREG (B)

Gregory Yob in a recent PRINTOUT requested short bits of code. Here ya be! Dunno what you'll do wi' it tho'.....

Lew Brown
Cottinsham Drive
Hellesdon
Norwich, Norfolk

```

10 0=33568:INPUT"clear screenWORD";
    A$:FOR I=1 TO LEN(A$):H=ASC(MID$(
    A$,I,1)):L=0+I-20*(H-64)
20 K=0+I:POKEK+20,H+64:FOR J=KTOL
    STEP 40:IF J=L THEN POKE J,123:
    GOTO 40
30 POKE J,97
40 NEXT J,I

```

Well, we entered it, and we ran it, and it's magic! Like the earlier METAPRINTING routine, there's no way we'll tell you what it does. Try it for yourself. And good on you, Lew! How'd you think it up?

SUPPORT FOR MARTIN

I agree with Martin Jacobs recent remarks about the unreliability of the Commodore printer manual. One illustration is that the cursor down symbol within inverted commas is sufficient to give both upper and lower case characters within the remainder of that line. Contrary to the instruction manual, the cursor up symbol is NOT needed. Also "?" for PRINT does work — at least, under some circumstances. Martin Jacobs says "I will not attempt to point out all the errors", but I'd be extremely grateful if he would, because as he himself says, this would save a great deal of time. Finally, if a program is written to work in upper/lower case mode (rather than graphics) on the PET it's nevertheless displayed in graphics on the printer. Thus any parts written in upper case come out as graphics. Is there any way of avoiding this?

M A Stern
Consultant Clinical
Immunologist
Leicester General
Hospital

As is abundantly clear, we're not the sort of people who go about saying nasty things about the Commodore. But their printer manual is naughtily misleading in places. Lots of places. Trouble is, PRINTOUT articles are necessarily finite in length, so poor Martin couldn't get into the lengthy catalogue he'd otherwise have liked. On your problem, the May issue of Personal Computer World ran a short article, with one Basic and one machine language program, either of which will act on your existing program to make it run properly on both screen and printer. The diagram labels for listings 1 and 3 were unfortunately reversed (it happens to the best of us!), but you should have no problems in understanding them. Desperate Dave Tebbutt, PCW's Editor, is a good friend of ours. We suggest you ring him on 01-

637-7991 for the best way to get hold of a back number.

AT LAST, AN ANSWER!

I reckon Gavin Sanders will like this subroutine, which will easily change any PRINT statement, anywhere in a program, to a REM, as soon as it's called.

Ken Hutchon
Scoonie Court
Leven, Fife

```

60000 INPUT"LINE NUMBER OF PRINT
    WHICH IS TO BE CHANGED TO
    REM":L
60010 HI=INT(L/256):LO=L-256*HI
60020 FORH=1024 TO 8000
60030 IF PEEK(H)<>0 THEN 60050
60040 IF PEEK(H+3)=LO AND PEEK(H+4)=HI
    THEN POKEH+5,143
60050 NEXT H

```

Gavin certainly will! He wept tears of joy as your letter came in. And, who knows, maybe Ron Geere will too. Why, it's the very routine we've all been looking for! And as for Mr Higinbotham, whose letter heads up this month's collection — he'll probably come right on up there to Scotland to shake you by the hand, Ken!

A SOMBRE NOTE

We thought you might like to know why we, as established PET dealers, will soon stop selling the PET/CBM range. We like the machine, but we do not like Commodore's tactics. If a PET is delivered to us new but faulty, we have to pay for the repair. Commodore overcharge grossly on spare parts too. For instance, a 4116 from Commodore costs £13 but we can buy it on the open market for less than £3. It gets to be a problem with things like print heads, which are only available from Commodore. They're priced right up, and and out of stock as often as not. Commodore promise what they call a generous dealer margin of 30% if you place a schedule of orders in advance, but we get a better dealer discount from ITT buying one-off, and ITT is never out of stock. They also give a one-year guarantee as opposed to Commodore's legally questionable 90 days. When we do return something to Commodore for repair, the charges are so high we're embarrassed to pass them on to our customers. So we intend to vote with our feet, and if Commodore don't change their policy, a number of other dealers we know about are likely to follow suit.

Name and address
supplied and
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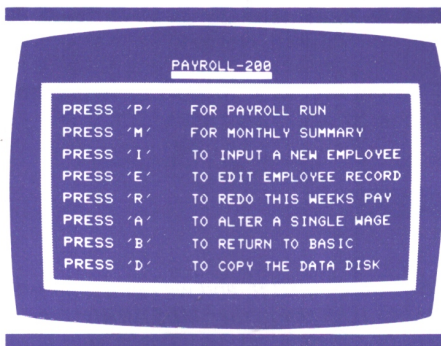
Oh dear! Any conceivable comment from us would be superfluous, but this really is the other side of the coin, is it not? Maybe Commodore would like to comment?

HOTLINE – News & Products



New Business Software Launch by Petsoft

The principal business applications are covered by a new catalogue from premier software suppliers Petsoft. As our off-screen pix make clear, the applications really are those which most firms need and use. Prices look pretty good to us on a quick comparison round the market. The new stock control package apparently handles 6,000 plus items (is your business that big?), all on-line, at £75. Payroll 200 (guess how many employees it'll handle?) will cost you £50, and sales or purchase ledger £120. Moving up-market, Wordcraft (on which almost the whole of this magazine is done, or we'd never get it out!) is more pricey at £325, but take our word for it, it's better than simply good; it's very very good. And at long last, VisiCalc is available for the PET (or should be by the time you read this) at £125. We'll be reporting on the latter (can it really do all that it says?) quite soon. VisiCalc excepted — it is available on CBM disk only at present — the packages are offered for both Commodore and Compu Think disk systems. All, that is, except the Petplan business game (which we never seem to win, sigh!), which comes on cassette only for £60. But that's because it's got the program on one side, and a real human voice commentary on the other! The Petsoft Book of Business Software is free from ACT at 66/68 Hagley Road in Birmingham. Ring them on 021 455 8585 if you want it quickly. "Book" is maybe a slightly grand title, but it is free and good reading to boot!



Sing, Sing, Sing!

IJJ Design Limited (of high-res. graphics fame, and alive and well at 37 London Road, Marlborough, Wiltshire; phone 0272 292966) also offer a hardware/software package that lets PET play music in four part harmony. Now 4-part harmony on your computer is a world away from the simple square notes you may, or may not, have tried previously. It's chords, and counterpoint, and apparently 4 notes at once (but not actually; the secret lies in paid switching). In other words, it's the real things, and highly creative to boot. The complete hardware/software package from IJJ costs just over £50, and includes a manual written by Byte magazine's Hal Chamberlain, who music enthusiasts will recognise as the master in this field. Look for a full review of the system in an early issue. Look too for high-resolution graphics revisited, IJJ have a new and more advanced version coming soon.

month, while the ICL main-frame processing adds another £73. Where else can you get that sort of control for under £100 a month. Roger Smith at ACT Bristol (Phone him at 0272-211733) can give you more details. P.S. We have just heard that the PETAL system is now available on the Compu Think disk systems; that should pack a fair punch;



Pet Gathers; Mainframe Processes!

It had to happen; a PET is being used to enter and validate sales data, and save it on cassette. Subsequently, a big mainframe in a service bureau is taking that cassette data and applying some very sophisticated ledger analyses. The picture shows the very start of process (and we do mean start!) at Mark Priest and Sons, a Bristol-based specialist firm, supplying hoists, chains and other lifting gear. Mark Priest's used to spend more than 4 man-days a month analysing its sales under more than 200 product headings. Now it gets these same analyses automatically as a by-product of using PET to process its sales ledger. The secret lies in PET's cassette tape, which then goes on to ACT Bristol who process the cassette, and produce all the high level analyses. The system as been labled PETAL, and the thought of PET and a giant mainframe working in concert is irresistibly attractive. That's to our journalistic minds of course, but it seems more than likely that other firms of the same size as Mark Priest will find it attractive for entirely different reasons. And those are likely to be that PET's rental costs Mark Priest's just £22 a

Pets Have Penetrated, OK!

It's alleged that PETs are being used to penetrate much larger computers through out the United Kingdoms! Or so the Observer newspaper claims, supporting this with evidence. We asked our man on the inside, Nigel West, to take a look at what's going on:

A secret association of programmers, calling themselves CRANK, seems to have circumvented the security, protecting data in machines ranging in size from the DEC 10 mini to IBM 370 mainframes. Sources say that PETs have been used to "dial up" larger computers, via acoustic couplers, and the public telephone network. CRANK members have information letting them make use of big computer operating-system bugs. Thus security measures designed to prevent unauthorised file access get sidestepped.

NCC Director David Fairburn describes these activities as "potentially dangerous". He says CRANK has people who know what they're doing, have got access to keys to certain systems, and have been able to reconstruct what is going on in those systems. An NCC investigation traced one CRANK member to the

STOCK NO.	0001
DESCR.	NAILS 2IN X 16SWG
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COST	0.09
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OPEN	1882
ALLOC.	148
MN.LEV	150
RE.PER	2
UN/TYP	BOX
UN/PRI.	0.13
VAT %	15.00
CODE	C102
TOTAL	127.4
TOTAL	66.2

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6	PRINT SUPPLIER LIST
7	STOCK POSTING
8	PRINT STOCK MOVEMENT REPORT
9	FINISH

HOTLINE (continued)

computer department of a national newspaper. Possible terrorist organisation links are being investigated. 25 Italian and 2 French computer installations have been attacked over the last 4 years. North London Poly microelectronics lecturer Chris Clark says CRANK is still operating. "They want to corrupt machines," he says. "They're people with a special grievance, through to those just wanting to cause trouble."

If You've Got Big Fingers...

Electronic Brokers of 49/53 Pancras Road in London (phone them on 01 837 7781 if you're impatient) have big keyboards for your PET, assuming you haven't got one on your PET already. They plug in easily, say Electronic Brokers, with two simple (their word, not ours, but we've no reason to doubt them) connections. You get an overlay for special keys, and your small keyboard remains active, if you want graphics. The only trouble seems to us to be the price. It's £145, which is quite a lot when you think of the present price of a big-keyboard 8K PET (don't forget CBM's latest price cuts too!)

How About a PET Slide Show?

A very nice letterhead came in the other day, from Heronview Limited. After peering at it for a few minutes, we realised what was imprinted in pale grey on the background. Would you believe a heron? Apparently Heronview have found yet another use for PET — controlling slide projectors, in those enormously complicated multi-media presentations. They have an impressive list of customers; names like British Airways, Courtaulds, Dunlop, General Electric, and so on. They're PET Agents too, so not surprisingly they've provided general software support on control applications to still more household names: British Steel, Wicks and Wilson, United Biscuits, to name a few. They even (they say) debug imported software for Commodore. We believe it! Contact Heronview at 3 Errol Street, London EC1, or phone them on 01 628 5423.

PSST! Want to Buy a T-Shirt?

Baroness International Public Relations (now there's a name to conjure with) were selling T-shirts at the PET show



just recently. They have some left, and if the sort of legend you see in the

picture is what turns you on, then reach into your pocket for £3.50 and you'll get one from the Baroness at 1-3 Old Compton Street, London W1. The money includes postage. Do remember — all you get for your money is the T-shirt. The ladies remain the property of Baroness International.

Commodore's Profits Keep Right On

CBM have published their results for the quarter ended last March. The net income of \$3,875,000 has more than doubled over the amount for the same period in the previous trading year: that was \$1,462,000. Net sales were \$33,735,000; again more than double the previous comparable quarter's \$16,443,000. We can't help wondering how much of it all came from the UK.

Are You into Pascal?

There are lots who are, or who'd like to be. Those still struggling with Basic may skip to the next item. The remainder of you, who might not have known, will be pleased to hear that Transam, of 12 Chapel Street, London NW1, have written the software for a British (hooray!) Pascal compiler to run on PET. And it's been officially endorsed by Commodore, to the extent that it was launched by the latter at the PET show. TCL's Pascal is on a floppy, and comes with a 105 page user manual, plus an introduction to Pascal, which those of you still struggling with Basic will certainly need (why don't you skip to the next item?).

Make-Your-Wife-Happy Corner!

Vembaroy Limited, who can be reached at the sylvan-sounding address of The Bringley, Church Street, Great Baddow, Essex (phone 0245 71726), have done what should have been done aeons ago. They've produced a custom-designed micro desk. As their leaflet says, "are you still computing on a spare table, with thousands of pounds worth of hardware fighting for space? Mains and ribbon cables winding between stacks of printer paper, listings, and delicately balanced disk drives?" Chillingly familiar? If it is, you might like to contact them. Their desk unit provides storage for everything you've got now, or are likely to have. Space stops us listing all its features, but it'll only cost you £170 for the 5 feet wide version, and around £196 for the 6 foot style. Considering the speed at which we spend money on the latest hardware goodies, and the price we pay for them, the desk sounds reasonable to us.

A Marriage Can be Arranged

Bright Electronics say they are "a small company rendering specialist manufacturing services to the electronics industry, in coil winding, PCB assembly, and prototype wiring". Refreshing honesty, and the rest of their literature has that sound too, but what is this to do with us, you may be asking? 'Tis simple: Bright Electronics have come up with, and are continuing to develop, some neat printer interfaces, which may at last let you

marry your PET to your favourite output device. Their AW2, for instance, lets you interface PET to parallel input printers, such as Anadex, Centronics, Axiom, BD80, and so on. Contact them at 29/31 Wincombe Drive, Ferndown in Dorset, or phone them at 0202 875075. You'll need to ask them how much, because they forgot to tell us.

DMS1 Has Got Bigger

It has? By gosh, it has! DMS1 is an information storage and retrieval system, made by Compsoft, who live at Old Manor Lane, Chilworth, Guildford in Surrey. Their phone number is 0483 39665. DMS1 has now sold over 100 copies, and at £170 a throw, that says a lot for the software's quality. Or one of the ladies that sells it; check the picture to see why. Now DMS2 has been



Heather Kearsley, who is having so much success selling Data Management System for Compsoft

born, and that adds numerical processing, so you can do things like calculating gross profit, inventory values, adjustments for exchange rates, and so on. Other exciting things are possible too: files can be compressed, extended, merged; and you can add or remove data at will. There's a whole lot of other nice things too, but why not help us save space by contacting Compsoft direct. Their package is CBM-recommended for the 32K disk-based machine.

Goodies For The PET

Wego Computers Limited (they're at 22a High Street, Caterham in Surrey, and you can phone them on 0883 49235) have some interesting-looking PET goodies. There's the (you're not going to believe this) PET Beeper, for a start. This beeps when a tape load starts, and beeps again when it's finished. To be honest, we're not entirely sure that a fairly straightforward user port connection wouldn't be as good; that way, you hear the header tone, the data load, the repeat data load, and the close file tone. True, the noise is irritating, and true too, you have to have messy connecting leads and amplifiers. None of these annoyances with the Beeper; it plugs straight in and is

HOTLINE (Contd)

self-contained. Then there's the Petunia, which "allows your PET to play music". There's got to be more to it than that, because just about everyone knows how to get sound out of PET; the picture we have of Petunia looks rather more complicated, so we'll investigate and report further in a feature. Then there's a Video Buffer and a Combo. The former "converts your TV to 75 ohm video output". A picture of the former looks like a well-built modulator unit. The latter is the buffer and the Petunia combined. Even more interesting is Wego's own mark-sense reader, which looks very intriguing from the material they sent us. We'll be reviewing the lot very fully soon.

Away With Dusty Diskettes

BFI Electronics have introduced two high-capacity and lockable diskette storage boxes, one for the five-and-a-quarter inch babies we love so well, and one for the bigger eight-inch brutes. The boxes are dust-proof, look nice (as you can see in the picture), and have moveable dividers to organise you and your diskettes beautifully. Once again, we're sorry to say we have no idea how much they are. If only the PR firms who send releases out (like Dan Bogard and Associates in this instance) would do their job, and provide the most important information, we'd all be a lot happier. Contact BFI at 516 Walton Road, West Molesey, Surrey. Their phone number is 01 941 4066.

a V.S.L
(VERY SPECIAL LETTER)



Every so often PRINTOUT gets a letter which simply can't be edited because it's so packed with information. Here's an example, from the Director of Audit at the Post Office. We believe every PRINTOUT reader will be interested.

Dear Mr Sanders,

PET TOKENS ETC.

I have been following with interest the byplay between yourself and Ron Geere on the subject of PET tokens. You may find the enclosed document of use to you.

I first prepared a list of PET tokens over a year ago but like you was, at first, unable to think of a use to be made of the knowledge gained. The first practical use which I saw was in a re-numbering program published in an American magazine.

You will note that the list not only shows the token numbers but also answers your question about an easy way to find them. I don't know whether or not you are aware that the PET Microsoft Interpreter starts with a table, commencing at address C000, which is in fact a table of the start addresses of the routines for each of the reserved words. For instance, you will see from the document that the token for the word END is number 128 and that addresses C000 and C001 contain the start address (less one) C71D, for old ROMs. I recently updated my document to show these addresses in decimal form and also to show the new ROM equivalent address.

The way in which the Microsoft Interpreter uses that first table is itself quite interesting and may be news to your readers. An article by Mark Zimmermann in Pet User Notes Vol 2 Issue 1 makes it clear that PET's BASIC doubles the value of the token (throwing away any carry) and puts the result into its Y Register. By using the contents of the Y Register as an offset from the (unused) addresses BFDF and BFDE the interpreter is led to the correct table entry containing the desired routine address for the particular token. It was by following this trail that much of the knowledge about PET ROM routines became widely known among PET hackers long before Commodore published detailed memory maps etc.

Though the words for which tokens exist are 'reserved' as far as BASIC is concerned it is perfectly feasible, and quite often very useful, to use them in message strings contained in machine language programs. Microsoft contains a table of those reserved words in ASCII form, starting at address C092 and my document has a column to show where each particular string is located.

In the same way, it may sometimes be desired to incorporate some of the BASIC error messages into machine language programs. Once again Microsoft contains a table, this time starting at address C190.

Incidentally, your readers may well be interested if you point out to them that the existence of such tables in Microsoft is one of the main reasons why attempts to dis-assemble the ROMs by using a dis-assembler often produce mere gibberish. This is because though all dis-assemblers can recognise valid op-codes with the related operands, and some dis-assemblers also give a memo ASCII meaning in case an ASCII string is being read, I am not aware of any dis-assembler which is able to recognise when it is trying to read a table of addresses.

I trust that the above comments may be of interest to you. You are, of course, free to publish either my document or any comments, as you wish.

Though I am not a registered subscriber to PRINTOUT I nevertheless buy every issue and I rate it as a very useful publication. You will see from my attached questionnaire that I am an avid reader of such publications. Keep up the good work.

Yours sincerely, H. M. Ball (Director)

PS. In a recent issue you referred to rumours which you had heard about a PET which printed Japanese. I think it probable that the reference is to a Japanese program called 'AFO' (short for Alien Flying Object) of which I have a copy. Its use of PET graphics is superb, not least because it does utilize the graphic characters in a way which produces king-sized Japanese characters. Various comments made by the (cartoon-type) aliens and humans are in the Japanese language but using European style print.

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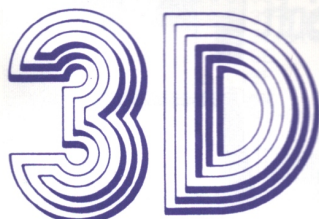
One way or the other you get a reliable memory from Plessey Microsystems, Europe's leading memory manufacturer. Either way you get a memory to make your Pet more like a powerful business computer.

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DMS is the best documented and most versatile information storage and retrieval system on the PET.—Nick Rosenberg, South East Computers, Castle Street, Hastings.

Very versatile, we use DMS in many applications. The best information system I've seen.—Mr. Isaac, Redland Technology.

DMS is available from major PET dealers or direct from:

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WORD	TOKEN NUMBER	ASCII TABLE ENTRY	ADDRESS TABLE ENTRY	ROUTINE START "OLD"	ROUTINE ADDRESS "NEW"
END	128	C092-C094	C000-C001	50974	51009
FOR	129	C095-C097	C002-C003	50761	50776
NEXT	130	C098-C09B	C004-C005	52278	52256
DATA	131	C09C-C09F	C006-C007	51184	
INPUT#	132	C0A0-C0A5	C008-C009	51910	51879
INPUT	133	C0A6-C0AA	C00A-C00B	51936	51905
DIM	134	C0AB-C0AD	C00C-C00D	53105	53088
READ	135	C0AE-C0B1	C00E-C00F	52004	51975
LET	136	C0B2-C0B4	C010-C011	51357	51373
GOTO	137	C0B5-C0B8	C012-C013	51101	51117
RUN	138	C0B9-C0BB	C014-C015	51061	51077
IF	139	C0BC-C0BD	C016-C017	51232	51248
RESTORE	140	C0BE-C0C4	C018-C019	50957	50992
GOSUB	141	C0C5-C0C9	C01A-C01B	51072	51088
RETURN	142	C0CA-C0CF	C01C-C01D	51146	51162
REM	143	C0D0-C0D2	C01E-C01F	51251	
STOP	144	C0D3-C0D6	C020-C021	50972	51007
ON	145	C0D7-C0D8	C022-C023	51267	51283
WAIT	146	C0DA-C0DD	C024-C025	55041	55056
LOAD	147	C0DE-C0E0	C026-C027	65493	65493
SAVE	148	C0E1-C0E4	C028-C029	65496	65496
VERIFY	149	C0E5-C0EA	C02A-C02B	65499	65499
DEF	150	C0EB-C0ED	C02C-C02D	53909	53901
POKE	151	C0EE-C0F1	C02E-C02F	53033	55016
PRINT#	152	C0F2-C0F7	C030-C031	51583	51595
PRINT	153	C0F8-C0FC	C032-C033	51615	51621
CONT	154	C0FD-C100	C034-C035	51013	51051
LIST	155	C101-C104	C036-C037	50600	50613
CLR	156	C105-C107	C038-C039	51056	50551
CMD	157	C108-C10A	C03A-C03B	51589	51601
SYS	158	C10B-C10D	C03C-C03D	65502	65502
OPEN	159	C10E-C111	C03E-C03F	65472	65472
CLOSE	160	C112-C116	C040-C041	65475	65475
GET	161	C117-C119	C042-C043	51871	51837
NEW	162	C11A-C11C	C044-C045	50513	50524
TAB(	163	C11D-C120			
TO	164	C121-C122			
FN	165	C123-C124			
SPC(	166	C125-C128			
THEN	167	C129-C12C			
NOT	168	C12D-C12F			
STEP	169	C130-C133			
+	170	C134			
-	171	C135			
*	172	C136			
/	173	C137			
↑	174	C138			
AND	175	C139-C13B			
OR	176	C13C-C13D			
>	177	C13E			
=	178	C13F			
<	179	C140			
SGN	180	C141-C143	C046-C047	56075	56159
INT	181	C144-C146	C048-C049	56222	56280
ABS	182	C147-C149	C04A-C04B	56106	56164
USR	183	C14A-C14C	C04C-C04D	-	-
FRE	184	C14D-C14F	C04E-C04F	53860	53849
POS	185	C150-C152	C050-C051	53893	53882
SQR	186	C153-C155	C052-C053	56868	56926
RND	187	C156-C158	C054-C055	57157	57215
LOG	188	C159-C15B	C056-C057	55487	55542
EXP	189	C15C-C15E	C058-C059	56992	57050
COS	190	C15F-C161	C05A-C05B	57246	57304
SIN	191	C162-C164	C05C-C05D	57253	57311
TAN	192	C165-C167	C05E-C05F	57326	57384
ATN	193	C168-C16A	C060-C061	57416	57484
PEEK	194	C16B-C16E	C062-C063	55014	55016
LEN	195	C16F-C171	C064-C065	54868	54870
STR\$	196	C172-C175	C066-C067	54089	54079
VAL	197	C176-C178	C068-C069	54917	54919
ASC	198	C179-C17B	C06A-C06B	54883	54885
CHR\$	199	C17C-C17F	C06C-C06D	54724	54726
LEFT\$	200	C180-C184	C06E-C06F	54744	54746
RIGHT\$	201	C185-C18A	C070-C071	54788	54746
MID\$	202	C18B-C18E	C072-C073	54799	54746

TABLE OF ERROR MESSAGES
(ASCII STRINGS)

C190	NEXT WITHOUT FOR	C21A	DIVISION BY ZERO
C1A0	SYNTAX	C22A	ILLEGAL DIRECT
C1A6	RETURN WITHOUT GOSUB	C238	TYPE MISMATCH
C1BA	OUT OF DATA	C246	STRING TOO LONG
C1C5	ILLEGAL QUANTITY	C254	BAD DATA
C1DA	OVERFLOW	C25C	FORMULA TOO COMPLEX
C1E2	OUT OF MEMORY	C26F	CAN'T CONTINUE
C1EF	UNDEF'D STATEMENT	C27D	UNDEF'D FUNCTION
C200	BAD SUBSCRIPT	C28E	ERROR
C20D	REDIM'D ARRAY		

MESSAGE STRINGS

CC13-	EXTRA IGNORED	CC24-	REDO FROM START
CC1F		CC32	

THE MERSEY MICRO SHOW

by John Stout

Most PET users were disappointed by the absence of new products at the Mersey Micro Show held at Liverpools Adelphi Hotel. Most, if not all were of the large keyboard variety with disk drives, of one sort or another being mandatory.

The most popular program on demonstration was Wordcraft, which was advertised as 'Probably the most cost effective word processor in the country'. It was shown running on both Commodore and CompuThink disks with Diabolo and Qume printers, and varying levels of expertise. One apparently unbiased visitor who had used the program for a school geography package, endorsed it in glowing terms. At £325 + VAT it should be good.

Perhaps the most tantalising titbit was an A4 data sheet in German describing a new PET peripheral: a plotter bearing a close resemblance to the Commodore printer but apparently capable of producing high quality graphics output. Such a peripheral would be ideal for use with the MTU high density graphics board or the new program-able character/high res. card from Petsoft.

On Only two stands was anything original being done with the PET. Most exhibitors appeared content merely to plonk down a couple of PETs, set a standard program running and sit back. In both of the exceptions the emphasis was on control, with Aughton Micro Systems using a PET to control a model crane picking up tin cans and another to control the water level in a cylinder by switching water flow on and off through a relay controlled valve. Stack Computer Services were using a PET to communicate with a main-frame in Staffordshire via an acoustic coupler attached to the public telephone network.

PETSHOW

Richard Pawson reports on this first-ever gathering of PET owners, suppliers, user groups and publications.

With all the advance publicity in Printout and elsewhere there is no excuse for any readers who did not attend this amazing show set amidst the ornate splendour or the Empire Napoleon Suite of London's Cafe.

For PRINTOUT, it meant the opportunity for the editorial team to meet many of our subscribers and contributors. It was certainly pleasing to hear that the magazine's format is going down so well, though we also intend to incorporate as many of the suggestions we received as possible.

The variety of equipment and programs on display at this show was astounding — as was the size of the crowd — even at 8 p.m. on Friday. This report can give only the skeletal details. For more information on any of the products, contact the suppliers concerned (addresses and phone numbers were given in our guide last issue).

Kit Spencer has now promised that this event will become a regular occurrence, so we hope that next time, even more of you will attend.



Part of the PRINTOUT team: Wendy, Mikal, Judith and Richard

VisiCalc has been described as the best piece of software for microcomputers yet. Indeed, it has even won that highest of accolades, the Adam Osborne White Elephant Award for best program of the year.

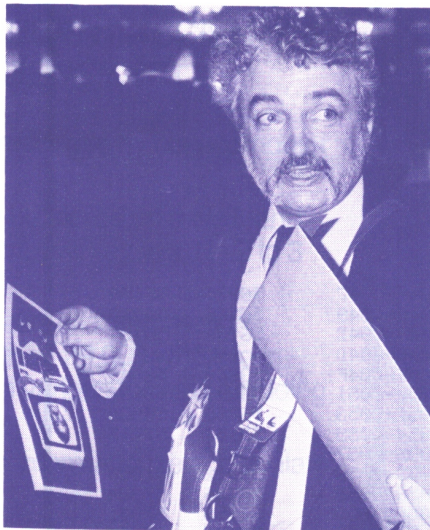
Having been available for some time on the Apple, VisiCalc for the PET was a subject being debated hotly at the PET Show. Both Commodore and Petsoft had announced that they would be distributing VisiCalc and launching it at the Show. In fact, neither had the product available for demonstration.

Enter Dan Fylstra — President and founder of the highly successful Stateside company, Personal Software, who market this program. Official U.K. distributors are indeed Petsoft, he confirmed.

Meanwhile, in an interview with Dan, I asked him about the origins of VisiCalc. "We had been concerned at the lack of a fully interactive management decision program, that could be used by anyone

without a knowledge of programming", he said. VisiCalc uses a tabular format, with the screen acting as a window onto a large array of number fields. Relationships between fields — for example, defining the bottom of a column to be the Grand Total, are typed in, though not as a program. Dan sees this as the main future for business software on the micro-computer — "so far, the trend has been towards the small-business accounting type of package, but the PET's great advantages are its friendly interactive capability and speed of calculation. We have several new products in the pipeline — all designed to aid a manager in business decisions."

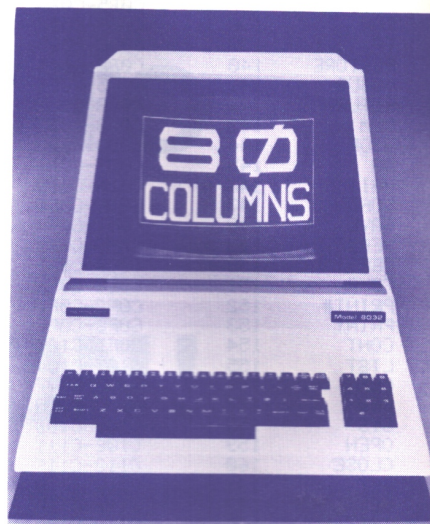
Personal Software adopt the unique philosophy of selling just a few, popular titles. So far, every one — Microchess is an example — has been a winner. VisiCalc looks like being no exception.



Butterfield Eight: Pope Jim the first

Jim Butterfield, as well as being one of the most knowledgeable PET personalities on the other side of the Atlantic, has something of a cult following in this country. It was particularly nice to see him in the U.K. for the PET Show — the first concentrated gathering of British PET owners, dealers, user groups and publications.

In a fascinating seminar on 'PET in North America', Jim gave details of the new PETs and BASIC 4.0 — interspersed with a fund of interesting anecdotes and illustrations. "For those of you who have not encountered the problem of garbage collection, which the new ROMs eliminate, I can best illustrate this by pausing for 15 minutes." PET networking is apparently taking off in the U.S.A. and it is to be hoped that the Commodore



8032 SuperPET — Star of the Show

Modem will soon gain GPO approval over here. We were told however, of one PET user who immediately switched off on discovering that he had been conversing for half-an-hour with an Apple!

Every year Jim brings a better music synthesiser program, which plays through the ultra simple (9 resistors and 1 capacitor) poor-man's A/D convertor. This year's, written by Dr. Frank Covitz, is so good that it must seriously make PET a rival for home organs. Another crowdpuller as an adaption to the simple game, NIM, where the pieces are machine code Androids — constantly fidgeting and chattering through a soundbox.

PRINTOUT's award for nonchalance must go to Nick Hampshire of Computabits for effecting the highest turnover from the most boring-looking stand. In addition to his definitive volume "The PET Revealed II", Nick has now produced a book of standard subroutines for the PET — which looks a must for serious programmers. We will be reviewing both shortly.

Above all else, the PET Show was great fun. Opened by a very sweet four-year old PET user, mascoted by a shaggy Old English Sheep Dog, the show was a welcome change from many utilitarian efforts — even Keith Hall was exuding bonhomie.

Inside Trader was having a heyday — picking up gossip, spreading malicious slander and generally making a nuisance of himself. A call over the tannoy for 'Inside Trader to the Information Desk' brought half the senior Commodore men running. Kit Spencer was walking around unawares with a sticker on his back saying "I am Inside Trader" in a remarkably familiar handwriting!



Night of a thousand PETs: setting up the show.

Commodore's staff looked professional for once, wearing uniform white skirts and 'Love is PETting' teeshirts — the girls that is. Audiogenic hired the best-looking pair of legs and sprayed-on denim shorts in London to attract the crowds. It was just as well that Guy Kewney was on holiday — he has words to say about that sort of thing.

The various User Group stands were showing off a variety of hardware devices. The Chromadaptor, which our black and white reproduction can't do justice to, is one of the cleverest pieces of design yet seen — to convert PET to a colour machine.

A just-finished-last-night remote control PET, used a converted Ultrasonic T.V. command box to control the display on a PET, and up to 8 external devices. Unfortunately, it also changed the channel of the neighbouring T.V. used to demonstrate Chromadaptor!

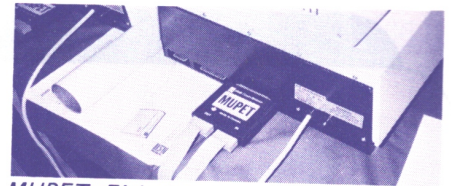
The North London Hobby Computer Club showed a remarkable conversion of the PET used in teaching electronics. The small keyboard had been removed and built into an external box. In its place was a piece of prototyping board, linked internally to all PETs programmable lines. Suitable software enabled the experimenter to see the effects of adding in new components to his circuit.

Robin Bradbeer was busy with his stand and so was unable to do his bopping routine for the two disco-oriented stands. One was a PET controlled light-rope — with the lights appearing to 'run' at various speeds.

The other exhibits came from Akwil Design Consultants — a light bulb moving message board, available in various lengths and buffer RAM sizes, with full editing on the PET. The same interface could also be used to communicate between the PET and Akwil's programmable audio mixer and disco-light panel.

The most exciting development for business and educational users is MUPET, the system which allows up to 8 PETs to access one disk. The hardware, which all runs via the IEEE bus has been so well designed that each PET thinks the disk is its own. The only noticeable delays come when particularly large files are being accessed.

Microprocessor Services had a prototype device which adapted PET for clocking-in employees. A large hybrid keypad is used for personnel to enter clock numbers, and these, together with the displayed time, are recorded on cassette for retrieval by the accounts department.



MUPET: 'Eight into one will go.'

For reasons which will be obvious, the system has had to be made impervious to mains fluctuations and failures. Microprocessor Services have tackled this problem with a battery back-up unit, which feeds the PET logic board directly, for up to 30 minutes — long enough to save the necessary data on tape. Price for this unit could be as low as £120.

A mains back-up unit was also shown by Banner Electric Co., providing 240V for up to one hour — though at a much higher purchase cost.

Terminal Systems Services offer a facility for editing and preparing telexes off-line using standard word-processing techniques. Paper tapes are then produced, along with a high-speed printout, ready for transmitting over the telex network.



The organizer: International Baroness Ilona von Uhl



Audiogenic's personal Pet, Jan Elliot

PET as a process controller received considerable support from several companies including Machsize and Stonefield Electronics. The former had another conversion of the PET to a rack-mounted unit, already in use by several companies for weeks on end without being switched off!

Stonefield showed off some advanced analogue to digital convertors, including an intelligent microprocessor version with automatic ranging, and an alphanumeric display showing the input value and engineering units.

Wego Computers' mark sense reader accepts cards with pencil-marked answers — for use in education, questionnaires and even stock control. Also shown was a workstation, designed specifically to hold a PET, disk and printer.

Last word went to Kit Spencer over the tannoy: "If Inside Trader would come to the Information Desk, I will wring his neck."



Antonia, Britains youngest programmer, opened the show.

Why PETSOFT Business Software



WORDCRAFT

WORDCRAFT A true Word Processor for the 32K PET. Wordcraft is a genuine word processing system, easy to understand and use, but containing all the facilities normally found only on more expensive dedicated Word Processors. Features include scrolling in both vertical and horizontal directions (to overcome small screen size), up to 117 characters wide and 98 lines deep for a full page of text. Written entirely in machine code for speed and compactness. Truly the Rolls-Royce of PET Word Processors. Send for brochure. **£325** on CompuThink or Commodore Disk.

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ACT SALES LEDGER A powerful system developed to ACT's own high standards. Provides full facilities for maintenance of the Sales Ledger, preparation of a list of outstanding balances and printing of statements. All data including new customer details, invoices, credits, cash and transfers are entered under step by step guidance on the display screen. Printed results include Audit List, Aged Debtors List, Control Accounts and Statements. For 32K PETs. Full manual supplied. Brochure available on request. **£120** on Commodore Disk. **£95** on Cassette.

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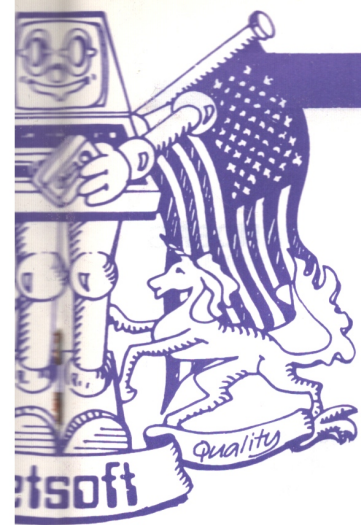
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STOCK CONTROL Powerful and flexible stock system with full facilities for recording and control of stock information. An audit listing is automatically printed which itemises all transactions including the entry amendment and deletion of master stock information, issues receipts, allocations, purchase orders. Printed reports include Full Stock Control, Stock Valuation, Reordering Report, Audit Listing. The system is highly flexible.

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PETPLAN BUSINESS SIMULATION
Petplan is a general management business simulation game which is exciting to play. Already it is widely used by colleges and Industrial Trainers to teach the skills needed to run a business. The program creates the model of a manufacturing company; you take the decisions. You will need to hire workers, invest in plant and premises, set advertising budgets and prices. At each stage screen reports (which may be printed out) show the results of decisions as they take effect. 50 page manual and voice guide on cassette. For 32K PETs. **£60** on Cassette.



are No.1 in... ware for the PET

VISICALC PROBLEM SOLVING SOFTWARE

VISICALC PROBLEM SOLVING SOFTWARE Acclaimed by the press as the most outstanding piece of PET software yet written, VisiCalc is a new breed of problem solving software that takes the hard work out of planning, projections and costings. Once your first projection is complete, you are ready to use the powerful recalculation feature. It lets you ask 'What if', examining new options and planning for contingencies. What if sales drop 20% in October? Just type in the sales figures and VisiCalc instantly updates all other figures affected by October sales. Invaluable to businessmen and students alike. Full manual supplied.
£125 on Commodore Disk.



Petsoft sell more programs in Britain than anyone else, for two simple reasons:
Quality and Value!

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If you can't find the program you need, contact us directly. We offer over 200 titles and can supply you directly. We will even take credit card orders over the telephone. Since we normally carry all programs in stock, you won't have long to wait.

PET is the trademark of Commodore.

Petsoft is backed by the resources of Applied Computer Techniques Ltd., Britain's leading computing group. With over fifteen years experience of developing business software, ACT has a reputation second to none in the industry. That is your guarantee.

If you would like more information on any of the programs mentioned on these pages, clip out the coupon. We will see that a free copy of our complete PET software catalogue reaches you without delay.

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Some other PETSOFT products described in our catalogue:

Programmers Toolkit £55

Plug-in ROM Chip adds nine useful commands to PET BASIC including RENUMBER, TRACE, DUMP, FIND and APPEND.

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Calculator program with synthetic speech via user port sound generator.

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A scientific approach to winning the Football Pools, on cassette.

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How to program in 6502 Assembly language. On CompuThink or Commodore Disk.

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☐ 16K PET
☐ 32K PET
☐ No PET yet

PET & PIECE

by
GAVIN SANDERS

A FUNNY THING HAPPENED ON THE WAY TO WRITE THIS COLUMN

Readers who may have thought the Geere-Sanders battle was over will be relieved to hear it isn't.

Nope - Geere's struck a mortal blow. And all I can do is turn to you, dear readers and trusty allies, for help and succour.

The other day, this little brown package arrived, clearly addressed to me. Now I've gone past the stage where I used to have - well, things - sent to me under plain, brown wrapper.

So not unnaturally, I eyed it with suspicion.

This feeling deepened when I opened it. There was a cassette and a short note inside. The note said I was being sent a grenade, with compliments. The pin, it said, would follow later.

Instructions were to load the cassette program, list it, run it, and then run myself. Like hell, it said, indelicately. And this missive was signed 'A Well-Wisher', Hah!

The effect was ruined by the cassette label, which bore Ron's name and address. I shan't give the latter here - I wouldn't want hordes of Gavin-lovers rushing round to lynch him.

And what did the little program look like when listed, and do when run?

Hmm! It had just five lines, the first of which was numbered '5' and the last of which was numbered '1'. There were a lot of curious goings-on in between.

It had a simple enough result when run, but effective for all that: flashing maddeningly, it said 'It's Geere again!'

Good on you, Ron! And a challenge to all my mates out there.....duplicate Ron's effect. Be warned, though; it's not as easy as it looks.

IF THIS DOESN'T CONVINCE YOU, NOTHING WILL!

A hiccup somewhere in Petsoft's distribution process held March and April's 'Cursor' away from my claw-like talons.

Which was nice, because one thing that's better than one 'Cursor' arrive is two.

First, I think I'd better repeat something I've said before (seasoned Gavin-readers may skip the next paragraph).

'Cursor' is the ten-times-a-year, US-produced magazine on cassette. It gives you six, repeat six, programs in every issue. Ready-to-go programs of rare quality and value, I give you my oath (beg pardon, I've been fantasy gaming again!)

10 issues a year will cost you just 36 quid. That's £3.60 for six programs, or 60p each. Where, I ask you, is any software sold so cheap?

Anyway, 'Cursor' outdid itself in March by a light-year or two with a program called 'Search'.

You need a CBM printer to run it, but given that, 'Search' must get your prize for the most novel program you've seen in a very long time.

What it does may not be your cup of tea, but the manner of the doing has got to command your attention and admiration.

You'll be familiar with those word-games, in which you're confronted with a solid rectangle of letters, concealing a number of words?

You're told what the words are; they all interlock; they're usually thematic; and they may run up or down, left or right, straight or diagonally.

Your job is to locate them; and the magazines in your local newsagent, with nothing else but these puzzles in them underlines their popularity.

Well, 'Search' creates these puzzles for you, using your words, and then prints both puzzle and solution while you wait.

Watching it happen, first on the screen then on the printer, all before your very eyes, as PET fits each of your words together, is vastly impressive and entertaining.

And as an object lesson in inventive, creative programming, it's something else.

For just 60p too! Like I said, if this doesn't convince you, nothing will.

Write to Petsoft for a 'Cursor' subscription now, quick, before you miss something else! If you're lucky, Petsoft II backdate your sub to March!

IN 4/4 TIME YET!

Had an enormous number of letters this month. In fact, my postbag grows with every month that goes by. Thanks to all of you, and I'll get round to answering every last one if it kills me.

Wait, cancel that. Ron Geere'll go right out for £10 worth of stamps!

The longest letter by far came from the Director of Audit for the Post Office, no less. And it was so fact-filled, it rates a whole space to itself elsewhere in this issue.

The funniest letter came from Colin Jeffery of Gosport, Hampshire.

Seems Colin tried out my recent tip on checking whether a tape had anything on it.

Remember? You press the 'less than' key while simply playing, rather than

loading, a cassette.

Colin went barmy though, and tried it with an ordinary music cassette. And what do you know, it works with that too!

Colin says the little 'less than' sign dances across the screen in 4/4 time, but that's loony. Everyone knows that PET uses hex.

HERE'S A THOUGHT

In the Wykeham Ward of the Royal Hampshire County Hospital in Winchester, there's a guy called Geoff Capell.

I'm not going to say much about Geoff, mainly because I'm darn sure he'd get mad as hell at me if I did!

So let me simply note that Geoff's in his thirties or so; has multiple sclerosis; and spends his time in one of those incredible wheel-chairs you manipulate around with a simple thumb pressure.

Which is just as well, because simple thumb-pressure is about all the movement Geoff has left.

That and his battery of PET-related goodies, and his plain, simple, but nevertheless wondrous, honest-to-God guts.

Considering he was a top cypher and electronics expert only a few years back at a highly-secret MoD place, he's stayed remarkably balanced in circumstances that would have fixed me but good!

So enough already. I simply wanted to say that if any one of you good people out there felt like dropping Geoff a line, do it.

He's really into PET and all that goes with it, and is inventive to a degree. You'll get a typed reply that'll have taken hours to do, but will repay you in simple information terms a dozen times over. OK?



And that's all for this month, hackers. Go safe, keep writing, and see you next issue.

TOMMY'S TIPS!

The North of England PET guru with the amazing knack of finding things about and in PET that no one else seems to know. As always, the odds-on bet is that something on this page will be useful to you.

'Structured program listings' is a phrase that covers a good idea with grand-sounding words. All it really means is varying degrees of indentation in different sections of the program.

What's the point? Ah, that's where we talk about value. If a program has a lengthy FOR...NEXT loop, or even worse, nested loops, with two, three or even more loops, one inside the other, it can be very hard to follow later.

If the main loop is indented on the listing though, with the first nested loop indented a bit more, and any other nested loops indented still further, things get very clear. You can literally see at a glance where one loop starts, and the next, and the next, and so on.

The only trouble is doing it on PET. Try entering a program line, and leaving several spaces between the line number and the line itself. As soon as you list the program, all those spaces vanish.

It is possible to start a line with a colon, and then indent from that. It won't give a syntax error, and it does allow indentation. The only trouble is that it looks really messy on the listing.

There's a better way to get indentation. Here's how.

Type your line number, and follow it immediately with any shifted graphic character. Any one will do, but the best is probably the half-tone square symbol - it's easily seen. Then indent as many spaces as you like. Keep in mind the need to indent still further if you have nested loops, when you come to the next loop, and so on.

Continue like this, varying the indentation according to need, but always remembering to put the graphic character immediately after the line number.

Now list the program. Presto! all the graphic characters have vanished, but the indentations remain.

One word of warning. If you subsequently edit any line that was indented, don't forget to put the graphic character back when you edit, or the indentation will vanish!

Users of old-ROM and new-ROM PETs will probably be familiar with the SYS command that simulates the action of turning PET off and back on again. In other words, performs what the jargon boys call a 'warm start'.

The advantage, of course, is the absence of jolt to the whole system that inevitably results from powering down and then powering back up again, while still getting the entire memory cleared of anything and everything that was in there.

For old-ROM PETs, the command is SYS 64824; for new-ROM PETs, it's SYS 64721.

So far, so good. Now, how would you like a warm-start command that works on both old and new ROMs, with absolutely no tests or modifications needed? It's in machine-code, but easily entered by anyone, with no prior knowledge needed at all.

You may well have guessed. It's our old friend SYS 826. Again this can be entered as a program line, and obviously it will be the very last line in the program. There's be little point in putting it any earlier!

As soon as the SYS is reached, PET will instantly go into a warm-start, and everything will be cleared - providing, of course, that the three POKEs were encountered at an earlier point in the program.

For machine language men, the hex equivalent is:

6C FC FF

Do you use CompuThink disk drives? How about a really smart way of protecting your programs from listing, copying or destruction?

If you've ever worked on your CompuThink drives late at night, and accidentally entered \$F,1 instead of \$D,1 and then watched your most valuable program get formatted right out of existence, this could be what you've been looking for!

It could be even more valuable if you've developed the world's smartest program and you have a paranoid suspicion that someone somewhere will rip it off. There's no way they can if you use this tip.

Ready? This is what to do.

One word of warning first. You must follow the instructions exactly, or you find yourself locked out of your own program, so fool-proof is what follows! If you don't do what I say, don't write to me to complain!

First (assuming the program you want to protect is already on disk), turn PET on and type SYS 45056 to get CompuThink's DISKMON into operation. Now.

Then load the program you're going to protect from the disk it's currently residing on.

Then save the program on to cassette. This is a vital safety precaution. Ignore it at your peril!

Now put PET through a warm-start with SYS 64824 for old-ROM machines, or SYS 64721 for new-ROM machines.

Next, load the program back in from the cassette on to which you saved it a few moments ago.

Now make the first line in your program-

10 REM*****

That's a REM statement, followed by 6 asterisks (the multiply symbol).

(Continued Page 27)

Tommy Turnbull is probably one of the most knowledgeable PET programming and systems men in the UK today. He writes exclusively for PRINTOUT magazine, and the depth of his knowledge is available to every subscriber. If you have a programming problem, an unexplainable PET phenomenon, or best of all, a tip that Tommy hasn't mentioned, write to him at PRINTOUT. He'll handle your enquiries, problems and tips on this page. Sorry, Tommy doesn't undertake to answer your letters other than through his regular PRINTOUT feature.

Sound good? Here's how.

You need an extra program line first of all, or you need to enter three POKEs as direct commands. Either will do, but the main value comes from including it in a program.

The three POKEs are:

POKE826,108;POKE827,252;
POKE828,255

Enter them as a program line if you wish, but then you must give them a line number, of course.

Having done that, only one other thing is needed, and that's a simple SYS command. And what might that be?



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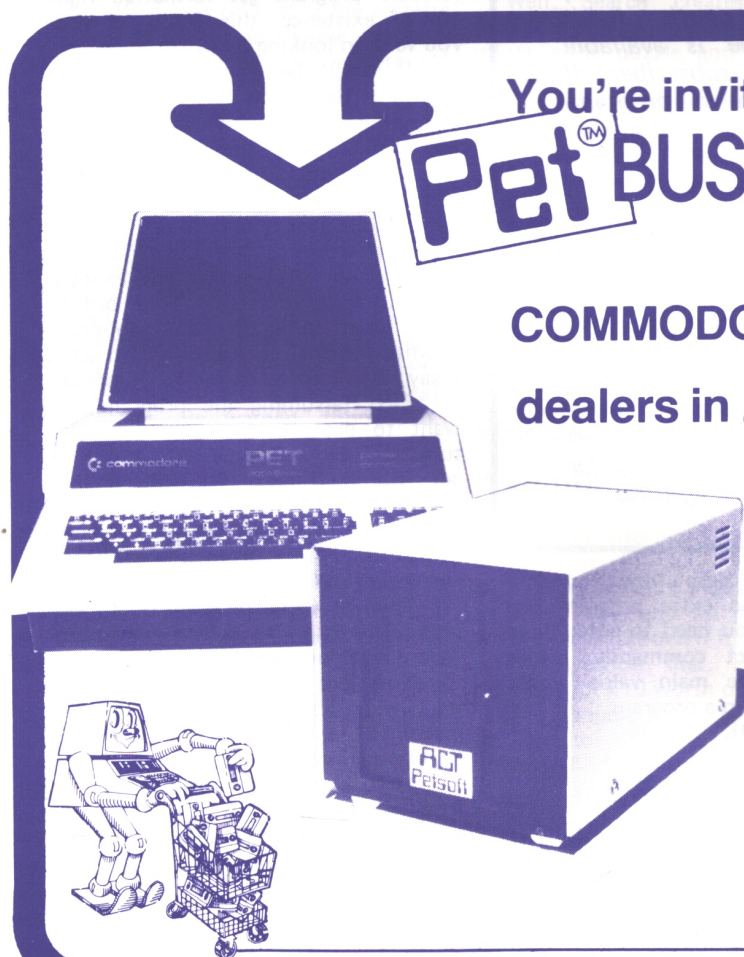
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PRINTOUT'S SOFTWARE REVIEWS

PROGRAM NAME: Keyboard Tutor 1
DISTRIBUTOR: Circle Software,
 33 Restrop View,
 Purton, Wiltshire
AVAILABILITY: On cassette or disk
PRICES: Cassette £12.00
 CBM Disk £15.00
REVIEWER: John Minshall

My qualifications to review this program were matched to the fact that I run a small mail-order business with a prolific word output.

Like thousands of others, I hack away at my keyboards (PET and IBM typewriter) with two fingers. Would this nine-lesson touch-typing course make me a master of the keys, as its designer claims? And with only a few minutes practice a day?

I loaded it, and was immediately impressed with the programmer's graphic representation of PET's keyboard, and with the explicit instructions. I was less impressed with the time allotted to read them. You need to comprehend with alacrity, or you get jollied along with the churlish message 'Please pay attention or play something else'.

Such a good program could well do without this, but it's a relatively minor criticism. The actual lessons wait for the operator, and the instructions are so comprehensive that documentation is made quite unnecessary. Note to Circle Software therefore: increase the comprehension time in production copies by changing the TI routine in the gosub routine at Line 2560.

Lesson 1 deals with the middle row of keys: ASDFGHJKL and the colon. You rest your fingers on the keys as directed, and the letters are highlighted sequentially on the screen display. You have to press the correct key, with the finger resting over that key, in synchronous rhythm. If you're correct, the screen letter changes to reverse field. After three or four passes, you get the result of your first test: percentage score; typing speed in words per minute; number of wrong keys pressed; key strokes missed; elapsed time; a comment and maybe a word of encouragement ('that's better, John!').

My marks, first time through, weren't encouraging! It's programmed to slow down to 7 w.p.m. second time through. Get it right - that's 100% right - and it uprates to 20 w.p.m. You then need two 100% scores to earn the reward of Lesson 2.

The course is well planned. Lesson 2 takes the middle row of keys randomly; Lesson 3 the next two up sequentially; Lesson 4 the same row randomly; and

Note on PRINTOUT's ratings:

Below 25:	Well below average
26 to 40:	Below average
41 to 60:	Average to good
61 to 80:	Good to excellent
Over 80:	Superior

Lesson 5 mixes the keys on both rows. You can't cheat. Suppose you lie through your teeth, when asked which lesson you were working on previously. If you answer with an untruthfully high number, and then fail the test, you get put back a lesson!

Lesson 9 is the big one. Get that far, and you'll be typing on all three letter rows in response to random prompts from the screen. And the programmer has thought of nearly everything. 'Problem' keys are automatically repeated a few strokes later; the run/stop key is inhibited throughout; but watch for the shift-lock - press that and no other key works.

Will the course teach touch-typing? With perseverance, probably yes. I had my wife examine it, and she's a very competent touch-typist. She says it's modelled on proven teaching methods.

The program takes 9,678 bytes and is, of course, meant for the big-keyboard PETs. If you want to run it in 8K, tell Circle Software, and they'll delete REMs to get it down to size. Don't feel too triumphant if you master it though; Circle Software tell us that Keyboard Tutor 2 is under development to take you still further!

Ratings:

First impressions:	78
Value for money:	96
Programming style:	74
Absence of bugs:	76
Usefulness:	88
Graphics:	91
Instructions:	93

PROGRAM NAMES: Cosmic Raiders and Invaders
DISTRIBUTORS: Commodore and Petsoft (and their dealers)
AVAILABILITY: Cassette only
PRICES: Both £7
REVIEWER: Gavin Sanders

These two programs are reviewed together because they both emulate the world's most popular video game: Atari's Alien Invaders.

Both are in machine language, so both are fast. Both have sound, good in both cases (but see our footnote regarding the CBM program). Both follow the approach of the original: serried ranks of outer-space nasties march steadily down on you. You must destroy them before they land. Both adhere to the original in giving you bases to hide behind. Both have a UFO from time to time which, if hit, explodes satisfyingly, increasing your score. And so on and so on.

In other words, both are faithful to the original concept, and there's nothing to choose between them on that basis. In fact, Petsoft gives an additional gimmick. Get rid of all the invaders, and super-invaders appear. They're super because they split into two from time to time!

So why is one somehow better than the other - at least, in my view (though I've tested both extensively with numerous willing volunteers, and their conclusion hasn't differed from mine).

Well, it's hard to say, why, but the consensus is that Commodore has a definite edge over Petsoft, notwithstanding the latter's super-invaders. It may be that the CBM invaders are better graphically (though they do appear grossly over-sized when first seen). Petsoft's invaders are tiny by comparison - actually, they're the graphic spade (as in card suits). Certainly control over the CBM laser-firing bases is more precise and easily managed. Petsoft's bases zip back and forth at the slightest touch, and exact positioning is near impossible. Though sound is good on both as already noted, the CBM invaders do make that menacing marching noise as they descend. The CBM invaders also seem somehow to be more deliberate and inflexible in their steady advance, creating that 'Gawd, they're gettin' closer!' feeling.

Their essential dislikes were the irritating little tune which the Petsoft game insisted on playing when they lost. They simply wanted to get on with the next game, and the tune annoyed them. Commodore's clumsy invaders put them off, but they soon learnt to respect them for all that.

The clincher is probably the price. The CBM games costs the same as Petsoft's so we commend the former, while also saying that you should certainly try both in your dealer's shop; your opinion may well differ from ours. If you're unable to try personally, then go for the Commodore version. You're unlikely to be disappointed.

(Footnote: the CBM program opens with an apparently helpful graphics display, aimed at showing the user how to connect PET for CB2 sound. This display unfortunately

(Continued Page 27)

A matter of style...

'PRINTOUT' Contributing Editor Lindsay Doyle, often pungent and controversial, but never dull, here begins a series aimed at helping you write better-looking and better-working programs.

There are many ways to display your ignorance. A friend of mine was asked, 'Speaking of authors, what do you think of Conan Doyle?' He answered, 'Both great!'

Another popular way is to write programs and submit them to the scrutiny of editors, critics and potential publishers. The level of most submissions is incredibly low. I used to think that I must be setting my standards too high until I found my sentiments mirrored by Gavin Sanders' recent editorial remarks. Emboldened by his words to realize that I am not alone, I offer the first in a series of articles in which I will cover some basic standards which can to advantage be observed by everyone in writing new programs or in the great work of cleaning up defective programs written by others.

NUMBERING

There is no excuse for starting with line number 1 and proceeding in steps of one, and there are good reasons not to, other than it makes it impossible to insert new lines. If the user has fallen out of a high-speed game program inadvertently he may write a digit or two and press RETURN before realizing that he is in command mode. His digits will then replace any program line with the same number, and the next game will have curious defects accordingly. Start with line number 1000! (Or if you can't steel yourself to that, at least start with line number 100!) Proceed in steps of ten. Leave thirty line numbers or more at the end of every definable block of program and start the next block at the even hundred. It will be a lot easier for you and for others who may follow after, to perceive the organisation of the program, and I assure you that there really are enough line numbers to go 'round for any conceivable program. So be profligate with line numbers!

REMARKS

The REM facility is cheap, too. Use an individual line of remarks to name each block of program material. But be precise and succinct. SAY 'REM: CONTOL LOOP.', not 'REM THIS IS THE BEGINNING OF THE LOOP THAT CONTROLS THE OPERATION OF THE ENTIRE PROGRAM'. To please me you can use a colon after REM and a period at the end of each complete phrase, omitting the period if the remarks are carried onto the next line. Try it: it's a lot more readable! Some people set off such headlines with a row of asterisks below and above, having experimented and discovered that it is not given to us in this lif to underline in REM. To my mind the appearance of eg.

```
100 REM *****
is garish to the extreme. You may disagree, but there's no accounting for
```

tastes. A more tasteful solution, if you will, is to write eg.

```
100 :
```

it sets off the following title line clearly, reserves the line number and doesn't even use REM! The colon will not generate a SYNTAX ERROR when used alone. It is also handy for indenting loops. Here is an example showing all these suggestions in use:

```
110 REM: POUND STERLING SYMBOL
120 DATA 0,9,63,73,65,33
130 OPEN 1,4,5
140 FOR I = 1 TO 6
150 : READ A
160 : A$ = A$ + CHR$(A)
170 NEXT
180 PRINT #1,A$
```

Although this little program could be considerably compressed, as far as I am concerned the only excuse for writing multiple statements per line is that every last bit of memory has been utilised and it is necessary to find space by whatever means is available. Compression is inverse to readability. Beginning programmers will find it hard to believe that they will not be able to read their own programs a few months hence: old hands will recognise the truth of that statement and will make the job easier by writing open, transparent instructions, using REMs to advantage, and other structural techniques which we will delve into in some detail in subsequent issues.

TITLES

Every program must have a title which SHOULD BE IDENTICAL in three places: on the cassette label, on the tape header, and in the first few lines of the program. You would be surprised to know how many programs reach me, some from commercial suppliers, for which this is not the case. For clarity in the program listing insert the actual title between single quotes and give the version number, source, modification information, and date on the same numbered line or on not more than two adjacent lines. Don't put all this in fancy frames made of asterisks. Here's my idea of a properly styled title:

```
100 REM: 'WUMPUS' FROM 101 B.G
TRANS 2/75 WITH MINOR MODS. BY
L.DOYLE.
```

```
110:
```

```
120:
```

Note the room left for someone else to add further notes without restructuring.

REFURBISHING

Unless you use floppy disks, every program that you acquire on tape should, if you want to avoid trouble, be copied onto two cassettes, one for your master file (C60 or C90) and one for current use (C10 or C12). This process ensures that your copies are optimised for your head's

own peculiar azimuth adjustment. This is the time to 'refurbish', to correct spelling errors, grammar and other little defects that we always find in others' work but never in our own, and to standardize the presentation of instructions, end-of-game options, use of GET vs. INPUT, and the like. There is no excuse for poor spelling, single spaced lines of instruction, lines which end half-way across the screen, omitted punctuation, or a score of other little, easily-avoided faults which I shall be describing.

Gavin Sanders explained in the January installment of 'Pets & Pieces' how to ease the problem of writing instructions, 40 characters or less to the line, by cloning a sample 40-blank line. I wish I had thought of that one! I would only add that one should include a CURSOR DOWN symbol at the beginning of each line, to generate double spacing.

INSTRUCTIONS

All games programs require instructions and some of the worst sloppinesses are perpetrated in these areas. I have seen instructions scrolling past too quickly to read, instructions that remained on the screen long enough to be read ten times over, instructions from one of the largest software houses in which the word itself was spelled 'INTRUCTIONS', but most often I find couldn't-care-less instructions with errors of grammar, commission, omission, layout, and several other sins not on the old Sunday-school lists.

To write good instructions is easy. There are only a few simple rules to be observed:

- 1.) The first display should include the name of the program and an option to read or bypass the instructions.
- 2.) The instructions should be displayed a screenful at a time, with the user, not the program, controlling the length of time that the page is displayed. I use:

```
200 PRINT "PRESS 'SPACE' WHEN
READY
210 WAIT 59410,4,4
```

This can be set up as a subroutine and referred to as often as require. As most of you no doubt know, line 210 responds only to the Space key. However any key pressed before the space key will be stored in the keyboard buffer and let loose when Space is struck. If you think this may cause problems, the classic alternative is:

```
200 PRINT "PRESS ANY KEY WHEN
READY.
210 GET AS : IF AS = " " THEN 210
```

GET is a curious beast that looks for the next output from the keyboard. When a key is not depressed, the keyboard outputs the null character, represented by

(Continued Page 27)

(Contd. Page 26)

"", and GET X\$ can't tell the difference between this and any other character, which is the reason why line 210 is designed to loop on itself until something other than the null character is input.

If my first PET manual had explained it like that I would have saved hours of unproductive labour teaching myself BASIC. As it seems that the second generation are all born knowing, GET X (the non-string equivalent) sees 0 from the keyboard as GET X\$ sees the null string, but will generate a SYNTAX ERROR if a letter or /, *, or = are pressed, while it accepts +, -, PERIOD and SPACE with equanimity. I'm sorry I started this discussion!

SCROLLING

Scrolling displays date back to the time when VDUs were unheard of and the ubiquitous Teletype printer or one of its many cousins were the only output devices available. THERE IS NO EXCUSE for the use of a scrolling display on a computer like the PET with its provision for erasing the whole screen instantaneously or rewriting controlled portions at command! Any commercial program sold as suitable for the PET which has a scrolling display has my total and unremitting scorn.

COMMANDS

In my vocabulary, the word 'instructions' refers to the stored explanations of how to proceed which the computer displays to you on 'command'.

The word 'command' refers to your inputs to the computer via the keyboard. In writing programs and in criticising programs written by others we should not assume that the user has any knowledge of BASIC or even familiarity with the keyboard. The most important computer users are those who are doing so for the first time, and if we want to contribute to making that a rewarding experience for them and to ensuring that they finish the session resolved to learn more rather than 'never touch the d****d thing again!', we should make sure that nothing they do will embarrass them. In particular it should be spelled out which keys are to be hit, and no wrong key should cause the computer to fall out of the program.

So let's discuss a standard for commands. First tell the user what responses or range of responses are acceptable, and then check his response against these criteria.

```
500 INPUT "home INSTRUCTIONS
('Y' OR 'N')";I$
510 IF I$="Y" GOTO 9000
520 IF I$<>"N" THEN PRINT cursor
down WRONG KEY! : GOTO 500
530 :
540 REM : GAME PROGRAM
```

Initial letters are always to be used, not complete words or '1 for Yes, 0 for No'!

The 'WRONG KEY' printout in line 520 could be called as a subroutine, as it

will be used at a number of points. The 'home' symbol in line 500 ensures that it doesn't print all over the screen. There is also a slight but attention-catching flicker as it is reprinted. Of course as soon as a correct response is noted the screen is blanked (NOT SCROLLED!) and the next display is written. Note that the Y and N are set off by single quotes to make it clear that they are the choice of inputs. This will prevent your next novice from having to ask you, 'Whats a YORN?'.

Suppose that you are in hot pursuit of a fleeing Klingon and you want to lay on the best quality of steam available:

```
600 INPUT " VELOCITY (1 TO 100
LIGHT YEARS PER SECOND)"; V
610 IF V<1 THEN...
620 IF V>100 THEN...
630 REM : ACCEPTS VALUE OF V
```

Assuming that you have previously rung up the engine room and given them the direction commands, they are now awaiting your speed commands. You should have the option to drop out and give a different command. It is best to arrange to return to the command selection line if an invalid command is given or if RETURN is pressed without a command. In a later article I will review how to protect a program against inadvertent use of RETURN or, for that matter, STOP.

TOMMY'S TIPS!

Continued from Page 23

If your program starts at Line 10 already, then choose a lower line number for the REM line. If your program starts at Line 0, you'll have to move things up a bit!

Now type, as a direct command (no program line number; this is nothing to do with the program):

SYS 45056 : \$S,1,'program name'

This must be on the same line, and separated by a colon. Replace 'program name' with the actual program name, of course, and use the relevant disk drive number - I've used '1' throughout this explanation.

Now press the return key when, as you might expect, your CompuThink unit will save the program on to disk.

The saving, however, is with a very significant difference. From this point on, there is no way at all that the program, when subsequently loaded, can be altered by you or anyone else.

More, it can't be listed, it can't be copied, and it can't be changed. It can, of course, be erased, but that's about all. In fact, once it's been loaded, only three direct commands can be used. They are RUN, \$GO and \$HALT.

Now this sort of lock-out demands certain precautions.

Do not, for instance, put Line 10 in when you're writing your program if there's even a slight chance that you might previously have initialised CompuThink's DISKMON with the SYS45056 command. If you do and you have, you'll be locked out of your own program, with absolutely no way back in again!

Do not use this system if you think you may want to come back later to change the program in some way. There is no way back once you've activated the protection.

Finally, do keep a back-up copy of your program, on disk or cassette, if you're going to use this method. It's totally fool-proof, so be warned!

Finally, I've seen lots of formatted pound signs for the CBM printer. Some of them looked like pound signs, some did if you half-closed your eyes, and some didn't look like pound signs at all.

For what it's worth, and after some experimentation, I've found the best data statements for a formatted pound sign are 9,63,73,73,65,33. Try them. Maybe best of all, they seem to be easily remembered, which saves rummaging through piles of notes when you're in the middle of programming!

PRINTOUT'S SOFTWARE REVIEWS

Continued from Page 25

contains an error which, at best, is simply wrong but, at worst, may be positively misleading. The graphics diagram shows the connection points on the user port, as, quite rightly, being the CB2 and ground contacts. These are, however, labelled as K and L in the diagram, when they should be M and N. Contacts K and L are PA6 and PA7 respectively. My first reaction was astonishment at Commodore's failure to correct this, either on the cassette, or in a written note included with it. Mature reflection, however, reminded me nostalgically that it isn't all that unusual for Commodore to behave like this. Buyers without sound at the moment should therefore beware when connecting up!)

Ratings:

First impressions:	79	54
Programming style:	83	87
Value for money:	84	80
Absence of bugs:	50	90
Enjoyment:	95	80
Graphics:	90	80
Instructions:	61	75

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(Tick the appropriate boxes)

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PRINTOUT READERS *RULE OK!*

In a survey, we recently asked you to tell us what you liked and wanted in this, your magazine. We weren't entirely ready for what turned into an avalanche of replies, but at last the analysis is complete. Terry Hope, PRINTOUT's new editor, examines the findings.

When I knew I'd be moving into the editor's chair, I really wanted to know what you, the readers, were like. And, of course, what you liked. Now, as I sit and contemplate a mountain of returns, I have only one reaction: thanks a whole lot for helping so much.

Completed survey forms came flooding back. They're still coming in, but the torrent has slowed to the point at which we can be reasonably confident that the percentages aren't going to change significantly. And I very much wanted to feed your reactions back to you as fast as possible. It's the only way I know of thanking you for being such a help.

The picture that's emerged is interesting.

First of all, suppose you're that rather unreal person, the average PRINTOUT reader. What are you like?

Well, you're somewhere between 30 and 39 years old, but only just. 31.4% are in that range, as opposed to 26.4% in the 20 to 29 bracket, with 20.0% between 40 and 49 as the third largest grouping. 5.9% are under 20; 3.6% are over 60 and the balance are in the 50 to 59 group.

LICENSED TO PRINT

You almost certainly have your own PET (74.5% have), and it's probably a 32K machine (a staggering 60.5%). It's almost certainly got a printer strapped to it (74.1% have them), with the preference going marginally to the CBM unit (40.0% as opposed to 34.1% for other makes).

Your machine is quite likely to have disks too (49.6%), with the preference again going to CBM (34.1%).

If your machine doesn't happen to be a 32K, don't despair. You're in good company; nearly one-third of you have 8K machines (32.3% to be precise). Half that number of people are coincidentally in the half-way house of 16K (16.4%), while rather more than that (18.6%) have either an 8K or 16K to which they've added extra memory.

And in case the eagle-eyed have spotted that the total comes to rather more than 100%, relax.....some readers had more than one machine, and rounding the percentages always leads to minor anomalies!

In terms of whether you're one of life's joiners, the survey demonstrates that clearly you're not. 61.4% fall into the category of not being a member of any sort of computer users' club or group.

And to what use is your machine put? Well, you're rather more likely to be using it for home or hobby computing (73.2% are in this group), than business (which accounts for 66.4%). Quite a number,

of course, used it for both; seems you just can't leave your machine alone, even after the office shuts!

UNUSUAL APPLICATIONS

One in four of you use your PET for some sort of unusual application (25.9%), and there's better than a two to one chance (18.2% as opposed to 7.7%) that you're happy to tell others about it if you do.

We respect totally the reasons which prompted those who said they'd rather not discuss their special application. Many of you actually explained why on your survey form.

For the other category, we'll be getting in touch with many of you, to see whether you'd be willing to let us have a short article. Don't necessarily wait to be contacted; contributions are always welcome (and paid for!), but do expect to hear from us eventually.

Marginally, you're the only reader of your copy of PRINTOUT (52.7% keep it to themselves), but a quarter of you lend it to one other person, and better than 1 in 10 lend it to more than two others! Do us a favour; ask them to buy their own!

In fact, you're prodigious readers of computer magazines. Quite honestly, it seems a wonder that you ever find time to get to your machines, so vast is your reading spread.

PRINTOUT IS TOP

Nine out of ten of you (exactly 90.0%) read PRINTOUT regularly, and there's just a four in five chance (81.8%) that you read Practical Computing too.

You're slightly less likely - three in five, or 64.5% to be precise - to read Personal Computer World, the third most widely read magazine. There's a slightly better than evens chance (52.7%) that you read Computing Today.

The official CBM Users' publication - itself dedicated to PET, by definition - doesn't rate that high. Fewer than half (49.1%) of you read it, and even fewer (32.3%) go for the other dedicated PET publication, the Independent Pet Users' Group (IPUG) magazine.

In terms of which publication from them all you enjoy the most - and that has to be the acid test - we were delighted when our specially-written survey analysis program told us that PRINTOUT was ahead by a reasonable margin.

In fact, a significant number of you quite separately wrote 'honest!' against your tick for that reaction.

Next in line to PRINTOUT, and just eight percentage points behind in the 'most enjoyed' stakes (29.1% to 37.3%) came Practical Computing.

ENJOYMENT

After that, the comparisons between 'most read' and 'most enjoyed' got really interesting.

For instance, and as we've said above, 52.7% of you read Computing Today; 49.1% read the CBM Users' magazine; and 32.3% read the IPUG publication.

But when it comes to 'most enjoyed' for these, the percentage ratios shift. 6.8% of you chose Computing Today, while the CBM and IPUG magazines attracted 7.3% each.

There's a lesson and a moral in there somewhere.

Coming back to PRINTOUT, and moving inside the magazine, what were your reactions to the regular features? Well, Gavin Sanders' Pets and Pieces was your 'most enjoyed' with a 64.1% vote, while the Hot Line new products news pages came a pretty close second, scoring 57.3%.

Gavin has three reactions to that: first, a really grateful 'thanks'; second, an indication that he's going to include a lot more about new products, to guarantee his place in the popularity stakes; and third, a request for more money!

SECRET FORMULA

I've noted the first, told him to stick to his formula for the second, and provided a crisp 'no' to the third!

Tommy's Tips eased in close behind the Hot Line feature with 47.3%, and that's a really interesting placing, in view of your votes for 'most wanted' articles. More of that in a moment.

Gregory Yob made a big impression on you, and his percentage of 41.1% based on just one single appearance before the survey is startling at first sight. Not at second look though, for those of us who know the old master, and again taking your 'most wanted' reactions into account.

Which brings us at last to exactly what you do want to see more prominently in your magazine.

And there's absolutely not the slightest shadow of doubt about that. By a huge margin - nearly 23% ahead of the next nearest - you've demanded much more on programming hints and tips (the figure was 79.1%).

MORE TOMMY

Which brings us right back to Tommy Turnbull and Gregory Yob. You may therefore expect to see Tommy getting much more prominence in PRINTOUT from here on, and to see Gregory's feature as a permanent fixture.

On the latter, we apologise to you rich readers, who get Creative Computing, one of the premier American magazines.

(Continued Page 31)

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CREATE

KCS="CREATE O:MAILFILE,120,15,1: SYS 24576
This example tells KRAM to create an indexed file called MAILFILE on the disk in drive zero, with a record length of 120 characters and a key length of 20 characters which starts at position 1 of the record. KRAM looks at the RESERVED variable KCS to identify the function and its parameters; the SYS call tells KRAM to execute the function. The record length can be any value up to 254 characters and the key up to 48 characters, a total of 302. KRAM packs as many records into the 255 character disk block as necessary.

OPEN

KCS="OPEN O:MAILFILE": SYS 24579 This tells KRAM that we will want to make accesses to the file called MAILFILE on the disk in drive zero. KRAM returns in location zero (peek (0)) the file number by which this file can be accessed during the rest of the program.

ADD

KCS="ADD 1,NAS,ADS": SYS 24591 This tells KRAM to add to file number one the data in variable ADS whose key is NAS. For example in a mailing list, the key NAS might be the name 'SMITH A.J.' and ADS might be the address '120, HIGH STREET, ANYTOWN'. Any normal double character string variable can be used to denote the key and the record.

GET

KCS="GET 1,NAS,ADS": SYS 24582 This tells KRAM to get from file number one the data belonging to the key NAS and put it into variable ADS. In our example, if NAS was 'SMITH A. J.', KRAM would read the address '120, HIGH STREET, ANYTOWN' from file and put it into variable ADS. If we weren't sure of the exact surname, we could give KRAM the key 'SM' and it would get for us the next alphabetically higher name beginning 'SM', together with its address! Or if we gave KRAM a blank key, it would find the first name and address on file.

READ

KCS="READ 1,NAS,ADS": SYS 24585 This tells KRAM to read the data belonging to the next highest key following the name in NAS, and put it into variable ADS. In our example, a complete file of names and addresses could be read in alphabetical order, starting at any name in the file, simply by executing successive READ commands! For instance, having got Mr A. J. Smith from file, executing the READ command as above would get us 'SMITH M.' in NAS together with his address in ADS.

READ -

KCS="READ-1,NAS,ADS": SYS 24585 This works like READ except BACKWARDS! It tells KRAM to read the data belonging to the next lowest key preceding the name in NAS, and put it into ADS. For instance, having read 'SMITH M.' with the forward read, executing the backward read as above would get us 'SMITH A.J.' in NAS together with his address in ADS.

PUT

KCS="PUT 1,NAS,ADS": SYS 24588 This tells KRAM to rewrite to file number one the data in variable ADS which belongs to key NAS. For instance, if we wanted to change Mr A.J. Smith's address, we would simply set NAS equal to 'SMITH A.J.', ADS equal to his new address, and execute the PUT function.

DELETE

KCS="DELETE 1,NAS,ADS": SYS 24594 This tells KRAM to delete from file number one the key contained in NAS and its associated data contained in ADS. In our example, to delete Mr A. J. Smith from the file, we would simply set NAS equal to 'SMITH A.J.', ADS equal to his address, and execute the DELETE function. KRAM will release for further use the disk space made available by the deletion.

CLOSE

KCS="CLOSE 1": SYS 24597 This tells KRAM that file one is finished with for now. KRAM updates the BAM on disk, but the file can still be used without another OPEN command.

INITIALIZE

SYS 24600 This function is used at the beginning of each program to clear KRAM's work areas and buffers.

The examples above illustrate the use of KRAM in a mailing list application, with disk access times from less than one second. KRAM can of course be used in any application program with the Commodore disk where programmer time, user time and disk space are at a premium.

Each KRAM package includes a ROM which plugs into the middle ROM socket of the 16K/32K Pet, a demonstration disk with a mailing list program and a 40-page User Reference Manual. KRAM is available by post (cash with order) price £115 including VAT, or by credit card phone the KRAM 24 Hour Order Desk on 01-546 7256; or see your nearest dealer. (Quantity discounts available).

Calco Software

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Mainframe software at a micro price

(Contd.)

PRINTOUT READERS RULE OK!

You'll have seen some of Gregory's material from time to time before, since we have a reciprocal agreement with Creative Computing which lets us print Gregory's feature. Since there's nothing comparable anywhere, we believe we're totally right in bringing Gregory to a wider audience.

Moving to the next categories you rated highly, two other majority votes emerged for PET-related hardware reviews and programming-aid software reviews (56.4% and 50.9% respectively). Duly noted, and expect to see an increasing emphasis on those two also.

PROBLEM AREAS

After that comes our two problem areas: instructional articles on Basic programming and machine-code programming. Both these scored 49.5%, but they represent a real difficulty.

Why? Because neither is something that can be handled by the occasional, or even frequent article. If they're to be done, they have to be done methodically, carefully, and well. You certainly won't disagree with that.

That means between one and two pages every issue, for something like one year at a minimum. And at that, it would only add up to 20 pages of text in total.

Where is there a comprehensive book on Basic programming, let alone machine-code programming, that's just 20 pages long? Answer: nowhere. Either subject needs and demands considerably more than that.

I think therefore that we'll be merging your expressed needs in that area into the regular features from Tommy Turnbull and Gregory Yob, with occasional excursions into the specialised one-off article, with a specific purpose behind it. I hope you'll agree that's a wise compromise.

While we're on 'most wanted reviews', PET-related books scored relatively highly with 45.9%, so you may certainly expect us to cover new books as they appear.

Technical articles on PET Hardware and peripherals scored well, with 46.4% and 43.2% respectively. We've taken careful note of that, and will be reacting appropriately.

PROGRAM LISTINGS

In the program listings area, the high score went to general program listings with 47.3%. When we got specific, and asked you about either business software or games listings, your enthusiasm waned visibly. Business listings managed 35.0% while games listings only rated 30.0%. Reviews of new busi-

ness software and new games software got the same relative result, with 36.4% and 21.4% respectively. You can therefore expect us to play those down somewhat, especially games. We'll make an exception only when something comes along which seems to us to be so remarkably innovative that it can't be ignored.

LOWEST SCORE

Lowest score of all went to educational software reviews, which managed only 20%. There isn't a great deal of educational software about, of course, and people tend to vote for what they know, and what they know they need. Nevertheless, your voice is clear on this area.

In fact, and in summary, your preferences have provided a pretty clear composite picture of you as a whole. You clearly prefer to do your own thing wherever, and whenever, you can, and your expressed desires for future issues of PRINTOUT are the clearest evidence of this.

All of us here in PRINTOUT's editorial offices thank you very sincerely for the time and trouble you took, and the help you've given.

Our aim remains unchanged — a magazine that contains what you want.

PEEKs & POKES

by Inside Trader

Crow-eating time for industry knowalls who scoffed at our predictions in Issue III. PET prices were duly slashed, Pascal published, Knuckledusters promoted and the SuperPET launched - all just as we forecast. Can it now be long before Nick Green gets his rise?

To the World Trade Centre to inspect Keith Hall's latest triumph. Unfortunately the National Micro Exhibition proves hard to find, and it is only by following signs to 'The Japanese Garden' that I eventually locate a seedy room stacked with dusty equipment. Whether the PET is actually the showpiece is a moot point, but not a single visitor passes through the turnstile while I am there.

I forecast that Hayden, publishers of the superb Sargon chess program, will shortly be sacking their British agents, Butterworths, who have notched up the remarkable total of zero sales so far this year.

Following revelations of CRANK's activities (see news pages) a certain North London PET pundit has been doing all he can to distance himself from that organization.

According to Leonard Tramiel, the reason his Papa opted for a single storey design for Commodore HQ was to prevent senior executive injury when window jumping.

The new el cheapo 150K single disk drive was on show again at the NCC. Only this time it worked.

Gregory Yob's PET manual has finally been printed - in Japanese. Details from ASCII Publishing, Tokyo.

Don't be too surprised if you find Chuck Peddle on the switchboard next time you ring Commodore Santa Clara. There is hardly anyone else left. Dennis Barnhart is out, and with him Larry Perry. Don Richards is gone, likewise Dick Barton, even Jack Tramiel's own son. Will the last person out kindly turn off the lights.

Teachers have been enjoying the Commodore Educational Newsletter. It was clever of Nick Green to enliven it with so many spelling mistakes.

Curse of the Commodore part 13: Following unflattering references to our favourite manufacturer, Practical Computing has been struck down with industrial troubles (i.e. everyone was sacked). I advise Editor Peter Laurie

to sacrifice a virgin before it is too late.

A surprise encounter at the Playboy Club with Jack Tramiel. The President sports a well-endowed Bunny on each arm. 'Just checking out the silicon situation' he grins.

Gregory 'It's not where you keep your laser, it is what you do with it' Yob suggests that tokens might be used for simplifying extensions to BASIC that use the 'wedge'. The Stringy Floppy uses @LOAD,@SAVE etc., the tokens simplifying the recognition algorithm.

The men in the pinstripe suits are moving in. Latest firm to receive a massive injection of venture capital is Personal Software, of VisiCalc fame. With at least two British manufacturers teetering on the brink of insolvency, it can't happen fast enough.

Not so bright after all: none of the pundits seem to have appreciated the significance of Commodore's new 4-bit microprocessor. Using CMOS technology the 4500 has 34 instructions, 2K bytes of ROM and a 176 byte scratchpad onboard.

Commodore owns a visual display company, Micro Display Systems Inc. They are currently flat out on a project to produce large size liquid crystal displays. The 4500 chip drives four LCD displays multiplexed - get the drift?

Personal Electronic Transactions

by Gregory Yob



When I think about writing to the entire world of PET owners, I have a problem similar to one faced by William Shakespeare a long time ago. Some of you are peasants (i.e., beginners with computers and the PET), and some of you are noblemen (the PET might be your second or third personal computer, or you make a living programming). Old Will solved it by having both fast action scenes and rambling elegant soliloquys. My unoriginal method is to include both very technical and very simple material in each column. Since I am a nonconformist, I will start with the technical material this month.

PET Input and Output

In 6502 based systems, all input and output is seen by the computer as memory locations. MOS technology provides several chips which are for I/O, and these chips have several memory locations reserved for I/O and the control of numerous options concerning I/O.

In the PET, two kinds of chips are used, two 6520's and one 6522. It isn't my intention to provide the specs for these chips here - contact MOS to get them. Figure 1 provides a table listing all the PET I/O lines and what they are assigned to. In most cases you can use the PEEK and POKE statements in PET BASIC to waggle these lines and see what they do - have fun!!!

More on PET Graphics

Here is some more info on using the PET in a graphical way. I must remind you that the program listings will follow the convention mentioned in the first column.

David J. Yob of Gallup, New Mexico (yes, he is a relative) tried out the PET false cursor program, and sent me this variation as an example of an irritating cursor: (I have to agree with him.)

```
10 PRINT"# 1ft"; : FOR J = 1 TO 50: NEXT
20 PRINT" 1ft"; : FOR J = 1 TO 50: NEXT(shift-apostrophe)
30 PRINT"$ 1ft"; : FOR J = 1 TO 50: NEXT
40 PRINT"% 1ft"; : FOR J = 1 TO 50: NEXT
50 GET A$: IF A$ = "" THEN 10 (" " is an empty string)
60 PRINT A$; : GOTO 10
```

Try it out!! If you use the screen editor, and move the cursor back into the line you just entered, change it and press RETURN again, entering this program isn't too tedious. Now try the following set of characters - you might like it (I get a "hurry it up!" feeling with this one.)
Line 10: N Line 20: A Line 30: M Line 40:]

I had never thought of animating the cursor, and wrote the following program to experiment with various combinations - note that this program lets you enter any

set of characters and will put them up as the cursor one by one. (This is one of the neat things about programming - you can make a specific idea more general.)

```
10 INPUT"CURSOR STRING: "; C$
20 FOR C = 1 TO LEN (C$)
30 FOR J = 1 TO 50: NEXT
40 PRINT MID$(C$,C,1) "1 ft"; : NEXT C
50 GET A$: IF A$ = "" THEN 20
60 IF A$ = "X" THEN 10
70 PRINT A$; : GOTO 20
```

Line 10 lets you enter a string which holds the characters you want to try out for the cursor. Lines 20 to 40 take each character in the string and displays it on the screen for a while. Lines 50 to 70 check for your keypress and echo it on the display. If you type in "X," you can start again with a new string. A variety of nice effects can be generated, with a few shown below:

- 1) #EDCAFR\$ Note: SPACE will be show as "sp"
- 2) \$ERDFCA
- 3) 'YHJBGT % % TGBJHY'
- 4) QQQQWWWW
- 5) + + + * * * Note no shift here.
- 6) + + + + + * * + + + + + * * + + + + +
+ + * * + + * * + + * * This one got rhythm.

Higher Resolution Graphs

Many of you have, no doubt, tried some of the simpler methods of drawing graphs on your PET - here is an example of what I mean:

```
10 X = 0
20 PRINT TAB (20 + 15 * SIN(X)) "*"
30 X = X + .2 : GOTO 20
```

This method will only provide 40 separate positions across the PET screen - somewhat worse than a Teletype*!! Attempting the same thing using the vertical axis, like an ordinary plot, is even worse, giving only 25 positions.

There are four sets of PET graphics characters which can provide eight times better resolution (320 across, 200 high), and these are shown below:

| | |
|-----------------|---|
| Horizontal Ramp | #EDCAFR\$ |
| Vertical Ramp | %TGBJHY' |
| Horizontal Bars | off sp, off %, off 4, off 5, off !,
rvs 6, rvs *, rvs ', rvs sp |
| Vertical Bars | off sp, off \$, off /, off 9, off ", rvs
8, rvs 7, rvs #, rvs sp |

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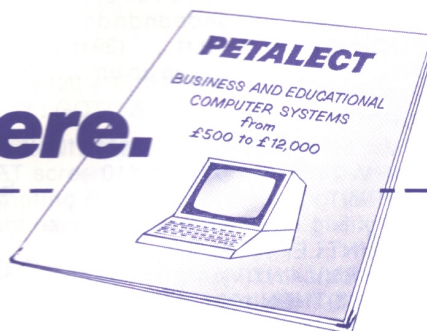
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The first experiment leaves you with the letter A about halfway down the screen. The second one will leave you the two numbers 1 and 32 respectively. A bit of thought reveals that location 33333 has the value 1 when PEEKed, and shows the letter A. Location 33330 is blank and has the value of 32.

To see all the codes used by the screen, try:

```
?“clrdn dn dn dn dn dn dn dn dn dn”:FOR J = 1 TO 255:
POKE 32768 + J,J: NEXT
```

(This will run off the edge - don't worry, the PET accepts up to two lines on the screen as a direct command.) All 256 possible characters will appear, 128 in normal field, and 128 in reverse field.

One way to get the code for a particular character is to home the cursor, print the character, move the cursor somewhere else, and use

```
?PEEK(32768)
```

The codes for the Double Density set are shown in Figure 2.

Now we are able to tackle the problem of doing a Double Density plotting program for the PET. The first decision is to define where the origin is (where $X = 0$ and $Y = 0$). Doing things backwards, the “home” position (upper left corner) is chosen. Then the directions for X and Y are found to be: X increases to the right, and Y increases going down. This lets us use a simple formula for getting the address in memory for an X,Y location. If we were doing a single density plot, the formula would be:

$$\text{Address} = 32768 + 40 * Y + X$$

For Double Density, it becomes:

$$\text{Address} = 32768 + 40 * \text{INT}(Y/2) + \text{INT}(X/2)$$

Plotting on the screen now consists of these steps:

- Step 1 Calculate the address and PEEK the screen memory to get anything that is already there.
- Step 2 Find out where the dot is to be placed in the 2x2 grid, and somehow combine this with what we found on the screen.
- Step 3 POKE the new character on the screen at the address calculated in Step 1.

Step 2 is the most complicated of these, and I must warn the beginners that perhaps you should skip this part and go on to the fun stuff - using this routine to make nice pictures.

If you look again at Figure 2, you will see a 2x2 box with the small squares numbered from 0 to 3. The table beneath the box shows the Double Density characters arranged so that if a small square is full for a character, the corresponding bit of the numbers 0 to 15 is a 1. I chose this arrangement so you could “cut” the 2x2 grid and lay the top to the right side to make the 1 x 4 binary grid - this was the easiest way to translate from the characters to the numbers 0 to 15.

When a point is to be plotted, the screen is PEEKed, and the table searched to find the correct character, and the character's number (0 - 15) is saved. Next, the X and Y values are checked to find out which corner has the dot in it. To combine the two values is easy (but a sneaky trick!) - just OR together the character from the screen and the character with the dot in the corner. This is done by ORing the table value for the screen character and the table value for the dot-in-the-corner character. (To be technical, the indices of the two characters are ORed to get the index of the character to POKE.) The new value is used to find the character in the table to POKE to the screen.

The little table on the right side has the OR and AND values for the four possible even/odd combinations of X and Y . If you wanted to plot in black, you would AND with the AND value instead of ORing.

Here is the Double Density Plotting routine - if you enter this and SAVE it on tape, it can be handy for many programs.

```
1000 REM DOUBLE DENSITY PLOT
1010 REM GIVEN X,Y,Z PLOT IN 80 X 50
1020 REM GRID WITH 0,0 AT HOME
1030 REM Z = 0 BLACK, Z = 1 WHITE
1040 REM CALL SUB 1500 BEFORE USING
1045 REM FIRST TIME.
1050 REM FIND WHAT'S ON SCREEN
1060 AD = 32768 + 40*INT(Y/2) + INT(X/2)
1070 DD = PEEK(AD)
1080 REM SEARCH TABLE FOR BIT PATTERN
1090 FOR PT = 0 TO 15
1110 IF DD = PX(PT) THEN 1150
1120 REM DON'T PLOT IF NOT FOUND
1130 NEXT PT: RETURN
1140 REM CALC OR/AND CODE
1150 EX = X-2*INT(X/2); EY = Y-2*INT(Y/2)
1160 ON EX + 2*EY + 1 GOTO 1170,1180,1190,1200
1170 CO = 2: CA = 13: GOTO 1220(CO is the two letters C &
1180 CO = 1: CA = 14: GOTO 1220 O)
1190 CO = 8: CA = 7: GOTO 1220
1200 CO = 4: CA = 11
1210 REM MODIFY ACCORDING TO COLOR Z
1220 IF Z = 1 THEN PK = CO OR PT (white)
1230 IF Z = 0 THEN PK = CA AND PT (black)
1240 REM PUT ON SCREEN
1250 POKE AD, PX(PK)
1260 RETURN
1500 REM DD PLOT INITIALIZE
1510 DIM PX(15)
1520 FOR J = 0 TO 15: READ PX(J): NEXT
1530 DATA 32, 124, 126, 226, 108, 225, 127
1540 DATA 251, 123, 255, 97, 236, 98, 254
1550 DATA 252, 160
1560 RETURN
```

Subroutine 1500 reads the character set into the table for use by Subroutine 1000.

Line 1060 computes the address for PEEK and POKE on the screen from X and Y . Line 1070 fetches the screen value as DD .

Lines 1090 to 1130 look through the table to find the corresponding character. The value PT is the indice to be ANDed or ORed later. If the character can't be found, the plot is suspended - this is a nice way of not overplotting any printing, axis, etc., that you might want on your plot.

Line 1150 sets EX to 1 if the X is odd, and EY to 1 if Y is odd.

Line 1160 selects one of four OR/AND values from EX and EY . The one must be added because PET ON - GOTO will jump only if the ON value is one or more. Lines 1170 to 1200 set the OR and AND values.

Lines 1220 and 1230 select the new indice depending on the “color,” 1 for white, and 0 for black.

Line 1250 POKes the new character on the screen. Note that PK points to the character in array PX .

Now, let's use our plotter for some fun! LOAD your double density subroutine and add the following code:

```
10 PRINT “clr”; : Z = 1: GOSUB 1500
15 PRINT “RAD,AMP,FREQ”
20 INPUT R,A,F
30 FOR AN = 0 TO 2*pi STEP pi/50 (pi is the key above
40 RA = R + A*SIN(F*AN) RETURN, shifted)
50 X = RA*COS(AN): Y = RA*SIN(AN)
60 X = INT(X+.5) + 45: Y = INT(Y+.5) + 25
70 GOSUB 1000: NEXT AN
80 END
```

Line 10 gets everything ready to go. Lines 15 and 20 let you enter some parameters which I won't explain - try the examples below and see what they do. Lines 30 to 50

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IPUG has grown rapidly over the last two years and is now seeking to expand its membership to include as many PET users as possible.

The advent of the new business PETs, complete with disk drives and printers, has meant that many small businesses are now using computers for the first time. Many of these new users have joined IPUG in order to meet other users and to share problems and ideas.

Hundreds of PETs are now in use in education and there is a pressing need to co-ordinate much of the excellent work being done with them. Similarly PETs are in use throughout industry doing anything from producing statistics to controlling plant. Add to this the large number of hobbyists using the PET and there is an obvious need for an organisation such as IPUG.

IPUG is a national organisation which produces a bi-monthly magazine dedicated to the PET. The magazine is intended to provide a forum for members' ideas and a channel for keeping them informed on all matters relating to the PET. To do this IPUG is in contact with user groups throughout the world, and also monitors the computer press for information about the PET.

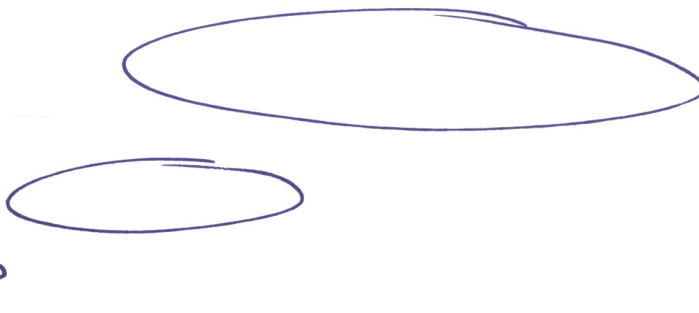
To make it possible for members to meet on a regular basis, IPUG has regional organisers throughout the UK who arrange meetings, talks, demonstrations, visits, etc.

IPUG is run by PET users, for PET users. All officers of the group are unpaid and volunteer their help in the hope that PET users will gain from the sharing of information. Offers of help are always appreciated.

The group also offers a library of programs that may be purchased at a nominal cost, and funds raised in this way go towards keeping the national subscription down.

The national subscription for 1980, from January to December will be £6.50.

All applications for membership should be addressed to:



IPUG

57 Clough Hall Road,
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Stoke-on-Trent,
Staffs.

compute the X and Y for a polar plotting function. (Sorry, I don't have enough space to explain this one better.) Lines 60 and 70 move the origin of the figure to the center/right of the screen and call the plotting routine.

Here are some values to try:

- 1) 0,20,2
- 2) 0,25,3
- 3) 12,12,5

- 4) 20,5,10
- 5) 20,0,0

If you want to do more than one at a time, make Line 80:

80 PRINT "hm"; GOTO 15

(Phew! - enough!!) This has been a long column to wade through. Happy plotting! □

PET Input/Output Lines — FIGURE 1

These tables relate the PET I/O lines to the internal PIA's and the VIA. See the 6522 and 6420 documents for how to control these lines.

KEYBOARD PIA (6520)

PA0 Keyboard column select
PA1 Keyboard Column select
PA2 Keyboard column select
PA3 Keyboard column select
PA4 Switch, Cassette #1
PA5 Switch, Cassette #2
PA6 EOI In
PA7 Diagnostic Jumper

CA1 Read, Cassette #1
CB1 Blank Screen and EOI out

Address: E810 59408

PB0 Keyboard row
PB1 Keyboard row
PB2 Keyboard row
PB3 Keyboard row
PB4 Keyboard row
PB5 Keyboard row
PB6 Keyboard row
PB7 Keyboard row

CB1 Video Sync in
CB2 Motor, Cassette #1

IEEE-488 PIA (6520)

PA0 IEEE Data In - 1
PA1 IEEE Data In - 2
PA2 IEEE Data In - 3
PA3 IEEE Data In - 4
PA4 IEEE Data In - 5
PA5 IEEE Data In - 6
PA6 IEEE Data In - 7
PA7 IEEE Data In - 8

Address: E820 59424

PB0 IEEE Data Out - 1
PB1 IEEE Data Out - 2
PB2 IEEE Data Out - 3
PB3 IEEE Data Out - 4
PB4 IEEE Data Out - 5
PB5 IEEE Data Out - 6
PB6 IEEE Data Out - 7
PB7 IEEE Data Out - 8

CA1 ATN in
CA2 NDAC out

CB1 SRQ in (not buffered)
CB2 DAV out

Note: All IEEE related lines are buffered except for SRQ in. This includes the lines in the VIA. CB1 of the keyboard PIA both blanks the screen and pulls EOI out low.

USER PORT VIA (6522)

PA0 Lsb of User Port
PA1 User Port
PA2 User Port
PA3 User Port
PA4 User Port
PA5 User Port
PA6 User Port
PA7 Msb of User Port

CA1 User Port handshake
CA2 Character set select (Graphics vs U/L case)

Address: E840 59456

PB0 NDAC in
PB1 NRFD out
PB2 ATN out
PB3 Write (Both cassettes)
PB4 Motor, Cassette #2
PB5 Video Sync in
PB6 NRFD in
PB7 DAV in

CB1 Read, Cassette #2
CB2 User Port handshake

Note: The Diagnostic LED will light if the Keyboard PIA is as follows:
PA0 High, PA1 High, PA2 Low, PA3 High, Others Don't Care

PS: It isn't clear whether the IEEE control lines should have the bar (to indicate low true) on top or not. Try it yourself and see.

FIGURE 2
DOUBLE DENSITY CHARACTER SET TABLE
AND
OR/AND CHARACTERS

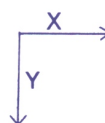
| | |
|---|---|
| 1 | 0 |
| 3 | 2 |

DOTS vs BITS

| CHAR # | 3 | 2 | 1 | 0 |
|--------|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 1 | 1 |
| 4 | 0 | 1 | 0 | 0 |
| 5 | 0 | 1 | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 |
| 7 | 0 | 1 | 1 | 1 |
| 8 | 1 | 0 | 0 | 0 |
| 9 | 1 | 0 | 0 | 1 |
| 10 | 1 | 0 | 1 | 0 |
| 11 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 0 | 0 |
| 13 | 1 | 1 | 0 | 1 |
| 14 | 1 | 1 | 1 | 0 |
| 15 | 1 | 1 | 1 | 1 |



| POKE | CHAR |
|------|--------|
| 32 | off sp |
| 124 | off |
| 126 | off |
| 226 | rvs " |
| 108 | off , |
| 225 | rvs ! |
| 127 | off ? |
| 251 | rvs ; |
| 123 | off ; |
| 255 | rvs ? |
| 97 | off ! |
| 236 | rvs , |
| 98 | off " |
| 254 | rvs |
| 252 | rvs |
| 160 | rvs sp |



| | X | Y |
|---|---|---|
| E | E | |
| E | O | |
| O | E | |
| O | O | |

E = EVEN
O = ODD

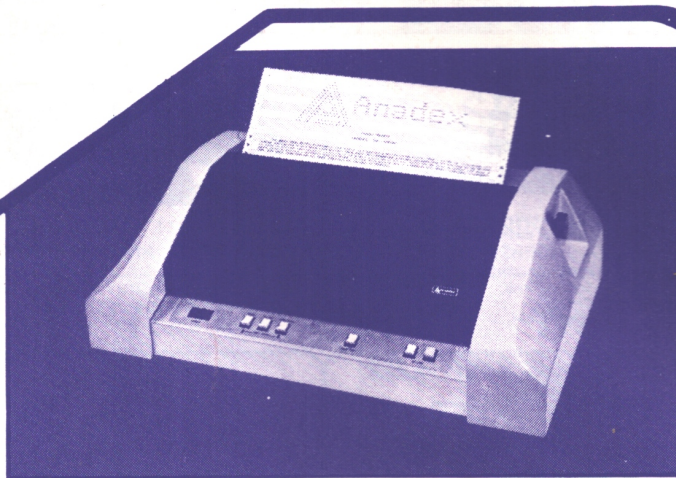


| CHAR # | TO |
|--------|-----|
| OR | AND |
| 2 | 13 |
| 1 | 14 |
| 8 | 7 |
| 4 | 11 |

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